

REVISION OF THE ARBORESCENT BAUHINIAS (FABACEAE: CAESALPINIOIDEAE: CERCIDEAE) NATIVE TO MIDDLE AMERICA¹

RICHARD P. WUNDERLIN²

ABSTRACT

Twenty-seven arborescent species of *Bauhinia* native to Middle America, of which 20 species are endemic, are recognized in a systematic treatment. It is postulated that the high endemism is the result of introduction of a few ancestral species from South America, followed by rapid speciation in the new habitat. *Bauhinia fryxellii* sp. nov., endemic to San Luis Potosí, Mexico is described and illustrated and *Bauhinia chapulhuacania* nom. nov. (= *B. dipetala* var. *macrophylla* Wunderlin) is proposed. Keys, descriptions, distributional data, and taxonomic index are provided.

The caesalpinoid tribe Cercideae is divided into two subtribes, the Cercidinae and Bauhiniinae (Wunderlin et al., 1981). The Cercidinae consist of three small distinctive genera; *Cercis* with six species in the temperate northern hemisphere, *Griffonia* with four species in Africa, and *Adenolobus* with two species in Africa. The Bauhiniinae contain the large, diverse, pantropical genus *Bauhinia* and the monotypic Madagascan genus *Brenierea*. The approximately 300 species of *Bauhinia* are important components of the floras of low and middle elevations throughout the tropics. The species are about evenly divided between the two hemispheres; however, they are most abundant in northern South America and southern Asia. In the Neotropics they range from southern Texas in the United States southward to northern Argentina. A few species extend into the Antilles and near offshore islands.

Bauhinia has two main phyletic lines, one giving rise to the *Bauhinia*, *Piliostigma*, and *Barklya* groups and the other to the *Phanera* group (Wunderlin et al., 1981).³ I confine further remarks here primarily to the *Bauhinia* group of the genus to which the native, arborescent Middle American species belong. The pantropical *Bauhinia*

group consists of approximately 150 species that are characteristically trees or shrubs (rarely subscandent), often with intrastipular spines, and the calyx spathaceous or dividing to the lip of the hypanthium into 2–5 lobes. Of this group, 27 species are native to Middle America, which is here defined as encompassing Mexico, Central America (including Panama), the Greater Antilles, and the northern Lesser Antilles (Leeward and Windward Islands). Trinidad and Tobago and the southern Lesser Antilles are excluded, since the few *Bauhinia* species occurring there are only northward extensions of those found in South America, which will be treated in subsequent papers.

In Middle America the *Bauhinia* group occurs in a variety of habitats ranging from tropical rainforest to deciduous forest to desert scrub. Most are shrubs or small trees but a few of the rainforest species are moderate to large trees (e.g. *B. picta* ranges up to 40 meters in height).

Pollination in the *Bauhinia* group in Middle America is usually by chiropterophily, psychophily, and phanaenophily, with melittophily and ornithophily suspected in some species but unconfirmed. Some species are self-compatible

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² Department of Biology, University of South Florida, Tampa, Florida 33620.

³ A reorganization of the Cercideae, an amplification of the overview by Wunderlin et al. (1981), is underway (Wunderlin et al., in prep.) in which infrageneric taxa will be defined and formally proposed and the phylogeny discussed in detail. For that reason, I have elected not to use categories which might be misconstrued as formal proposals of infrageneric names in this work. The terms "group," "alliance," and "suballiance" as used here are more or less equivalent to subgenus, section, and subsection respectively.

while others are self-incompatible (Heithaus et al., 1974; Heithaus, 1979). Plants with functionally staminate and/or pistillate flowers, usually along with normal hermaphroditic flowers, are found in many of the species.

The seeds of members of the *Bauhinia* group in Middle America are autochorous in that the fruit valves are explosively dehiscent. Mammaliochory may also be involved in further seed dispersal, e.g. removal by nut- and seed-storing rodents. Ornithochory, although not confirmed for this group, may have played a role in dispersal, especially over water.

Seed beetles (Bruchidae: Bruchinae) have exploited *Bauhinia* seeds as a larval food, *Gibbobruchus* feeding almost exclusively on members of the *Bauhinia* group (Whitehead & Kingsolver, 1975). Most *Gibbobruchus* species feed on several *Bauhinia* species; none are host specific. *Caryedes* feeds mainly on papilionoid legumes but the *stenocephalus* group feeds on two widespread species of the *Phanera* group of *Bauhinia* (Kingsolver & Whitehead, 1974).

TAXONOMY

The last comprehensive revision of *Bauhinia* was that of Dietrich (1840), who recognized 81 species. Three to four times that number of additional species have been described since that time. There has been no comprehensive treatment either of a major infrageneric group on a world-wide basis or in a major geographic area (i.e. Neotropics, Paleotropics, or continent) although floras of numerous countries or small geographic regions have included treatments of *Bauhinia* and sometimes segregate genera. Few of these regional treatments agree taxonomically, thus complicating the situation. Specimens collected recently have yielded data that make many of these regional treatments out of date. For example, Schery in 1951 recognized 13 species of *Bauhinia* native to Panama but Wunderlin in 1976 reduced five of them to synonymy and added three others. Of the 13 names used by Schery, only four are retained by Wunderlin. Thus in a span of only 25 years the taxonomy of the genus for Panama has been greatly modified. It is readily apparent that this large and important genus is long overdue for revision. This paper is the first of a series involving a comprehensive revision of the Neotropical species.

Among the floristic treatments of the Neotropical Cercideae during this century, that of Britton and Rose (1930) is of special interest. Britton and Rose, in revising the species of North

America (including Mexico, Central America, Panama, and the Antilles), departed from the then current systematic trend by recognizing *Alvesia*, *Caspereopsis*, *Casparia*, and *Schnella* as genera distinct from *Bauhinia*. Unfortunately, they erroneously adopted Kunth's concept of *Casparia*, placed in it the type species of *Bauhinia* and redefined *Bauhinia* in the sense of *Pauletia* Cav. In their revision they recognized one species of *Alvesia*, ten of *Bauhinia*, one of *Caspereopsis*, thirty-four of *Casparia*, and nine of *Schnella*. The taxa treated in the revision presented here include those placed in *Bauhinia* and *Casparia* by Britton and Rose. *Alvesia* and *Caspereopsis* constitute introduced Asiatic species and are excluded for that reason. Those placed in *Schnella* by Britton and Rose are members of the *Phanera* group and will be treated in subsequent works. Three later treatments of *Bauhinia* in countries within the scope of Britton and Rose's work are those of Standley and Steyermark (1946), who treated the species of Guatemala and recognized 13 native species; Schery (1951), who treated the Panamanian members of the genus, also recognizing 13 native species; and Wunderlin (1976) who also treated the Panamanian species, recognizing 11 native species.

A considerable amount of taxonomic confusion at the specific and infraspecific levels plagues *Bauhinia*. This confusion can be in part attributed to the phenotypic plasticity of those vegetative characters that have erroneously been emphasized by various workers. Taxonomists lacking a broad understanding of the genus have placed undue emphasis on vestiture, shape, and degree of lobing of leaves. As a result, several wide-ranging, phenotypically polymorphic species have been described a number of times from specimens collected in widely separated localities. On the other hand, some species that had been considered to be polymorphic by some workers are actually composed of two or more distinct taxa. The size of the genus and its great morphological diversity have therefore contributed to a variety of delimitations at all taxonomic levels. As previously stated, all recent work has been done on a regional basis in conjunction with floristic projects and few wide ranging species or species groups have been examined throughout their range by these workers. This has also contributed to the proliferation of superfluous names.

PHYTOGEOGRAPHY AND PHYLOGENY

The 27 species of the *Bauhinia* group native to Middle America can be divided into three

species alliances herein referred to as the Divaricata, Petiolata, and Aculeata alliances (Table 1). The Divaricata alliance consists of 17 species, all endemic to Middle America except one recently discovered, undescribed species endemic to eastern Brazil. The Petiolata alliance consists of about 14 species in the Neotropics, four of which are endemic to Middle America and three shared with South America. The Aculeata alliance consists of about 80 species in the Neotropics and two in the Paleotropics. Of these, only four occur in Middle America and all are shared with South America. Each of these alliances is further subdivided into suballiances of which by far the largest in Middle America, with 15 species, is the Divaricata suballiance of the Divaricata alliance (Table 1).

The greatest species diversity within the *Bauhinia* group in Middle America is in Mexico, where 22 of the 27 species treated in this work occur, 11 of which (*B. andrieuxii*, *B. chapulhuacana*, *B. coulteri*, *B. deserti*, *B. fryxellii*, *B. jucunda*, *B. macranthera*, *B. pes-caprae*, *B. pringlei*, *B. ramosissima*, and *B. subrotundifolia*) are endemic. No species of *Bauhinia* is endemic to any other country in Middle America. Of the 11 nonendemic species found in Mexico, eight (*B. cookii*, *B. dipetala*, *B. divaricata*, *B. erythrocalyx*, *B. jenningsii*, *B. pansamalana*, *B. rubeleuziana*, and *B. seleriana*) extend into Central America, some as far south as Costa Rica, two (*B. divaricata* and *B. jenningsii*) range east into the Greater Antilles, one (*B. divaricata*) barely reaches the Lesser Antilles, one (*B. lunarioides*) extends north into southern Texas, and two (*B. pauletia* and *B. unguolata*) are wide ranging species that extend into northern South America. The remaining five species in Middle America are northward extensions of South American species. One of these (*B. beguinotii*) extends north to Panama and Costa Rica, two (*B. picta* and *B. petiolata*) extend north only to Panama, and one (*B. aculeata*) extends north to Panama and is apparently disjunct in El Salvador. The remaining species (*B. multinervia*) occurs in northeastern South America and extends north only into the Lesser Antilles.

The primitive androecium of *Bauhinia* has all ten stamens fertile. The 15 Middle American endemics in the Divaricata suballiance are notable in having a single fertile anther. This character is otherwise found only in the Asian *B. monandra* Kurz and the Madagascan *B. porosa* Boiv. The occurrence of this unusual androecial condition in the Asian and Madagascan species

I consider an example of convergent evolution; I do not wish to suggest that they are closely related to the Neotropical monandrous species. Five of the Neotropical monandrous species (*B. chapulhuacana*, *B. deserti*, *B. dipetala*, *B. fryxellii*, and *B. jucunda*) are further distinguished by having the corolla reduced from the five petals typical in the genus to four or less. This character is unique for *Bauhinia* as a whole. *Bauhinia coulteri*, the single member of the Coulteri suballiance of the Divaricata alliance, has flowers with three fertile anthers. This character is shared with only two other Neotropical species, *B. pansamalana*, a member of the Petiolata alliance; and an undescribed species native to eastern Brazil that is a member of the Divaricata alliance. The functionally triandrous condition reappears in a few Paleotropical species of the *Bauhinia* group and is common in the very distantly related Paleotropical members of the Phanera group of *Bauhinia*, again a case of convergent evolution.

I postulate that propagules of a few progenitor species of the *Bauhinia* group were disseminated into Central America and Mexico from South America, became isolated, and gave rise to the 20 species endemic in Middle America (see Table 1). I further postulate that the remaining seven species of the *Bauhinia* group found in Middle America today have more recently migrated into that area from South America.

A hypothetical explanation for the distribution of the Middle American species of the *Bauhinia* group can be based on current theories of continental drift. Assuming that the ancestral Caesalpinioideae evolved in the Late Cretaceous (before 65 m.y. BP), it reasonably follows *Bauhinia* evolved, began to diversify, and spread from its probable center of origin in Africa to South America and Eurasia in the Paleogene. The further back in the Paleogene time that *Bauhinia* and the various constituent lines within the genus evolved, the shorter the water gaps that it would have to traverse between Africa and South America, the probable pathway between the Old and New World. Once the progenitor species of *Bauhinia* reached South America, it probably rapidly speciated there in relative isolation from Africa and North America. Until the early Late Eocene (ca. 50 m.y. BP) South America was probably closer to Africa than to North America (Raven & Axelrod, 1974) which would have made movement of the genus into North America more difficult than from Africa to South America. However, *Bauhinia* seems to have been in North

TABLE 1. Arrangement of the alliances and suballiances of *Bauhinia* within the arborescent *Bauhinia* group represented in the Neotropics with emphasis on those occurring in Middle America. Species endemic to Middle America are indicated by an asterisk (*). Formal proposal of infrageneric taxa will be made and reasons discussed in detail in the proposed reorganization of the Cercideae (Wunderlin et al., in prep.).

<p>Divaricata Alliance—Unarmed; calyx spathaceous; fertile stamens 1 or 3; pollen 3-colpor(oid)ate, sexine reticulate or striato-reticulate, occasionally with elongate supracteal processes.</p> <p>Divaricata Suballiance—Petals long-clawed; fertile stamen 1.</p> <p><i>B. chapulhuacania</i> Wunderlin*</p> <p><i>B. deserti</i> (Britt. & Rose) Lundell*</p> <p><i>B. dipetala</i> Hemsl.*</p> <p><i>B. divaricata</i> L.*</p> <p><i>B. erythrocalyx</i> Wunderlin*</p> <p><i>B. fryxellii</i> Wunderlin*</p> <p><i>B. jenningsii</i> P. Wils.*</p> <p><i>B. jucunda</i> Brandeg.*</p> <p><i>B. lunarioides</i> A. Gray ex S. Wats.*</p> <p><i>B. macranthera</i> Benth. ex Hemsl.*</p> <p><i>B. pes-caprae</i> Cav.*</p> <p><i>B. pringlei</i> S. Wats.*</p> <p><i>B. ramosissima</i> Benth. ex Hemsl.*</p> <p><i>B. rubeleruziana</i> Donn. Sm.*</p> <p><i>B. subrotundifolia</i> Cav.*</p> <p>Coulteri Suballiance—Petals sessile; fertile stamens 3, adjacent.</p> <p><i>B. coulteri</i> Macbr.*</p> <p>Petiolata Alliance—Unarmed; calyx spathaceous; fertile stamens 3 or 10 (also 5 in extra-Middle American species); pollen inaperturate, sexine reticulate with blunt, spinelike infracteal processes.</p> <p>Petiolata Suballiance—Fertile stamens 10.</p> <p><i>B. andrieuxii</i> Hemsl.*</p>	<p><i>B. beguinotii</i> Cuf.</p> <p><i>B. cookii</i> Rose*</p> <p><i>B. petiolata</i> (Mutis ex DC.) Triana ex Hook. f.</p> <p><i>B. picta</i> (H.B.K.) DC.</p> <p><i>B. seleriana</i> Harms*</p> <p>(7 additional species in South America.)</p> <p>Pansamalana Suballiance—Fertile stamens 3, separated from each other by a staminode.</p> <p><i>B. pansamalana</i> Donn. Sm.*</p> <p>Aculeata Alliance—Armed with intrastipular spines or unarmed; calyx spathaceous or splitting to lip of hypanthium; fertile stamens 5 or 10; pollen inaperturate, 3–6-colpate, or 3–4-colporoidate, sexine reticulate with clavate supracteal processes or 3–6-poroidate, sexine with blunt, spinelike infracteal processes.</p> <p>Aculeata Suballiance—Fertile stamens 5 or 10; pollen inaperturate, 3–6-colpate, or 3–4-colporoidate, sexine reticulate with clavate supracteal processes.</p> <p><i>B. aculeata</i> L.</p> <p><i>B. pauletia</i> Pers.</p> <p><i>B. unguata</i> L.</p> <p>(Ca. 70 additional species in South America and 2 in Paleotropics.)</p> <p>Multinervia Suballiance—Fertile stamens 10; pollen 3–6-poroidate, sexine reticulate with blunt, spine-like infracteal processes.</p> <p><i>B. multinervia</i> (H.B.K.) DC.</p> <p>(5 additional species in northern South America.)</p>
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America long enough to allow the differentiation of the endemic species. This pattern is similar to that found in the Cactaceae, Krameriaceae, Liliaceae-Allieae, Loasaceae, Martyniaceae, Nyctaginaceae, Onagraceae-*Fuchsia*, Tecophilaeaceae, and Zygophyllaceae (Raven & Axelrod, 1974; Berry, 1982; Peter Raven, pers. comm.).

I suggest that propagules of one or more members of the Divaricata alliance were disseminated to North America and subsequently diversified. Members of this alliance possess the most advanced characters (e.g. reduction in fertile anther and petal number) and are now restricted to North America and the Antilles and a single species disjunct to eastern Brazil.

Propagules of the Petiolata alliance were also disseminated to Central America and gave rise to the endemic *B. pansamalana*, the only known member of the Pansamalana suballiance, which

is characterized by three fertile stamens, a feature shared in the Neotropical species only by *B. coulteri* and a recently discovered, undescribed species in eastern Brazil, both of the Divaricata alliance. Similarly, other propagules of the Petiolata alliance could have given rise to the three other endemic species of the Petiolata alliance, *B. andrieuxii* Hemsl., *B. cookii*, and *B. seleriana* Harms.

It is probable that the wide distribution in Middle America today of species such as *B. pauletia* and *B. unguata*, the presence of *B. aculeata* in Panama and disjunct to El Salvador, of *B. beguinotii* in Panama and Costa Rica, and of *B. picta* and *B. petiolata* in Panama are the result of more recent migration from centers in northern South America.

The presence in the Greater Antilles of only *B. divaricata*, a widespread weedy species of

Mexico south to Nicaragua, and *B. jenningsii*, also found in the Yucatán Peninsula of Mexico, Guatemala, and Belize, indicates *Bauhinia* is probably a relatively recent member of the flora of the Greater Antilles.

The occurrence of two northern South American species, *B. aculeata* and *B. multinervia*, in the Windward and Leeward Islands suggests that these species may also be recent migrants into that area.

Furthermore, five species of *Bauhinia* that belong to the Phanera group, not treated in this revision, also occur in Middle America. Four of these (*B. glabra* Jacq., *B. guianensis* Aubl., *B. hymenaeifolia* Triana ex Hemsl., and *B. microstachya* (Raddi) Macbride) are wide-ranging South American species, and one (*B. reflexa* Schery) is endemic to Panama but closely related to South American species. These also appear to represent relatively recent additions to the flora of Middle America.

Finally, about 20 species, of which seven have become naturalized, are cultivated in Middle America. These also are not treated in this revision but will be dealt with in subsequent floristic works. They include four species native to Asia (*B. acuminata* L., *B. monandra* Kurz, *B. purpurea* L., and *B. variegata* L.), two to Africa (*B. galpinii* N. E. Br. and *B. tomentosa* L.), and one to South America (*B. bauhinioides* (Mart.) Macbr.).

SYSTEMATIC TREATMENT

BAUHINIA L., Sp. Pl. 374. 1753; non Kunth, 1824; nec Raf., 1838. LECTOTYPE: *Bauhinia divaricata* L.

Pauletia Cav., Icon. 5: 5. 1799. LECTOTYPE: *Pauletia inermis* Cav. [= *Bauhinia unguolata* L.].

Amaria Mutis, Sem. Nuev. Rey. Gran. 2: 25. 1810. LECTOTYPE: *Amaria petiolata* Mutis ex DC. [= *Bauhinia petiolata* (Mutis ex DC.) Triana ex Hook. f.].

Bauhinia Kunth, Ann. Sci. Nat. (Paris) 1: 85. 1824; non L., 1753; nec Raf., 1838. LECTOTYPE: *Bauhinia aculeata* L.

Casparia Kunth, Ann. Sci. Nat. (Paris) 1: 85. 1824. TYPE: *Casparia pes-caprae* (Cav.) H.B.K. [= *Bauhinia pes-caprae* Cav.].

Perlebia Mart. in Spix & Mart., Reise Bras. 2: 555. 1828; non DC., 1829 [Apiaceae]; nec Schmitz, 1973. TYPE: *Perlebia bauhinioides* Mart. [= *Bauhinia bauhinioides* (Mart.) Macbr.].

Bauhinia Raf., Sylva Tellur. 121. 1838; non L., 1753; nec Kunth, 1824. LECTOTYPE: *Bauhinia aculeata* L.

Cansenia Raf., Sylva Tellur. 122. 1838. LECTOTYPE: *Cansenia unguolata* (L.) Raf. [= *Bauhinia unguolata* L.].

Mandarus Raf., Sylva Tellur. 122. 1838. LECTOTYPE: *Mandarus divaricatus* (L.) Raf. [= *Bauhinia divaricata* L.].

Ariaria C. Marq., Estud. Arq. Etno. Amer. 1: 141. 1920. TYPE: *Ariaria superba* C. Marq. [= *Bauhinia tarapotensis* Benth.].

Perlebia Schmitz, Bull. Jard. Bot. Nat. Belg. 43: 381. 1973, nom. inval.; non Mart., 1828; nec DC., 1829 [Apiaceae]. Type of *Perlebia* Mart. excluded and type of *Perlebia* Schmitz not designated.

Other generic synonyms exist for *Bauhinia*, but only those that apply to the Neotropical species of the *Bauhinia* group are listed here. Typification of generic names listed above is given in Wunderlin (1976a).

Trees or shrubs, with intrastipular spines or unarmed; stems and branches terete or nearly so. Leaves entire, bilobate or bifoliolate; stipules small, linear to lanceolate to ovate, caducous or rarely persistent; intrastipular excrescences minute or sometimes adpetiolar enlarged and subulate or forming an intrastipular spine. Inflorescences racemose, paniculate, or flowers paired or solitary, terminal, or subterminal and axillary; bract solitary, small, linear to ovate; bracteoles 2, similar to bracts but smaller; flower buds linear to lanceolate; sepals 5, valvate, united nearly to apex, usually with free tips, limb spathaceous or splitting into 2–5 lobes to or nearly to hypanthium lip; nectaries usually present on interior of calyx at base; hypanthium cyathiform to tubular; petals 5, rarely fewer, free, imbricate, usually subequal, or less commonly unequal, clawed or sessile, spatulate to filiform, white, pink to red, green, or yellow, uppermost usually darker or differing in pattern; stamens 10, basally connate, diplostemonous, the alternate shorter, 1, 3, 5, or all 10 fertile, sterile stamens (if present) variously reduced, filaments of fertile stamens filiform or stout, anthers ovate to linear, apex emarginate to apiculate, base sagittate, dorsifixed, versatile, theca opening longitudinally; pollen spheroid to peroblate, inaperturate, 3–6-colpate, or 3–4-colpor(oid)ate, 3–6-poroidate, sexine striate, striato-reticulate, or reticulate, sometimes with supracteal or infracteal processes; gynoecium often equalling androecium, gynophore long, acentric, adnate to abaxial wall of hypanthium or free, ovary several-ovulate, style filiform or stout, stigma capitate or oblique. Fruit woody, elastically dehiscent or indehiscent legume; seeds laterally compressed, surface ob-

scurely marked, albumen present, radicle straight or nearly so, cotyledons flat, funicular aril-lobes short, each appressed to seed at maturity and forming a narrow scar.

Because of the great morphological diversity of the genus worldwide, the above description is applicable only to the Neotropical species of the *Bauhinia* group.

KEY TO SPECIES

- 1a. Plants armed with evident intrastipular spines.
 2a. Petals white, elliptic to obovate; fertile stamens 10; buds linear-lanceolate, 3–4(–5.5) cm long 1. *B. aculeata*
 2b. Petals green, filiform; fertile stamens 5; buds filiform, 8–10(–12) cm long 18. *B. pauletia*
- 1b. Plants unarmed (if apetiolar intrastipular excrescence enlarged, then merely subulate and 2 mm long or less).
 3a. Fertile stamen 1.
 4a. Corolla of usually 1–3, rarely 4, usually unequal petals, sometimes with 1 or more vestigial.
 5a. Leaves with lobes less than 3 cm wide and conspicuously divaricate.
 6a. Corolla usually with only 1 petal well-developed, others vestigial or absent; style less than 1 cm long at anthesis, stout; endemic to southeastern San Luis Potosí, Mexico 11. *B. fryxellii*
 6b. Corolla usually with 3–4 petals well-developed, others vestigial or absent; style over 1 cm long at anthesis, filiform; endemic to central Veracruz, Mexico 13. *B. jucunda*
- 5b. Leaves with lobes over 3 cm wide and parallel or only slightly divaricate.
 7a. Leaves (6–)10–15(–30) cm long; legume (15–)18–25(–30) cm long 4. *B. chapulhuacania*
 7b. Leaves (3–)5–11(–12) cm long; legume (8–)10–15(–18) cm long.
 8a. Leaves chartaceous, usually lobed less than half their length (rarely lobed to one-half), sinus between lobes usually acute at base 8. *B. dipetala*
 8b. Leaves subcoriaceous, usually lobed half or more their length (rarely lobed less than half), sinus between lobes usually obtuse to rounded at base 7. *B. deserti*
- 4b. Corolla always of 5, subequal petals.
 9a. Petals distinctly pink, purple, or red.
 10a. Leaves bifoliolate, 1–2 cm long, leaflets 2–(3)-nerved 23. *B. ramosissima*
 10b. Leaves bilobate or entire (rarely bifoliolate in some forms of *B. macranthera*), 4 cm long or longer, 7–9-nerved.
 11a. Inflorescence less than 10-flowered; petals pink, blade subequalling the pilose claw; lower surface of young leaves glabrous or pubescent, but not with yellowish-brown hairs 15. *B. macranthera*
 11b. Inflorescence 20-flowered or more; petals brick red, blade about twice as long as glabrate claw; lower surface of young leaves with yellowish-brown hairs 24. *B. rubeleruziana*
- 9b. Petals white or cream (sometimes turning pinkish in age in *B. divaricata*, but then branches and undersurface of young leaves never with yellowish-brown hairs), or white with a conspicuous red median stripe.
 12a. Leaves bifoliolate 14. *B. lunarioides*
 12b. Leaves bilobate or entire.
 13a. Leaves entire 12. *B. jenningsii*
 13b. Leaves bilobate.
 14a. Petals white with conspicuous red median stripe 22. *B. pringlei*
 14b. Petals white (sometimes turning pinkish in age in *B. divaricata*), without a conspicuous red median stripe.
 15a. Petals pilose.
 16a. Leaves suborbicular, bilobate for about half their length; flowers buds always erect 26. *B. subrotundifolia*
 16b. Leaves ovate to oblong, bilobate for $\frac{3}{4}$ or more their length; flowers buds reflexed when young, erect at anthesis 19. *B. pes-caprae*
- 15b. Petals glabrous or glabrate.
 17a. Calyx bright red, free tips obsolete 10. *B. erythrocalyx*
 17b. Calyx greenish or rarely with dull red tinge, free tips ca. 2 mm long 9. *B. divaricata*
- 3b. Fertile stamens 3 or 10.
 18a. Fertile stamens 3.
 19a. Petals pink (rarely white) sessile; leaves suborbicular (2–)3–5(–6) cm long 6. *B. coulteri*
 19b. Petals white, short-clawed; leaves ovate, 12–22 cm long 17. *B. pansamalana*

- 18b. Fertile stamens 10.
- 20a. Leaves entire (sometimes bilobate on same plant).
- 21a. Shorter stamens connate for about half their length; leaves with inner pair of nerves usually closer to midrib than to outer adjacent nerves 3. *B. beguinotii*
- 21b. Shorter stamens free nearly to base; leaves with inner pair of nerves usually equidistant or closer to outer adjacent nerves than to midrib 20. *B. petiolata*
- 20b. Leaves always bilobate.
- 22a. Inflorescence, lower surface of leaves, and fruits brown tomentose ... 25. *B. seleriana*
- 22b. Inflorescence, lower surface of leaves, and fruits other than brown tomentose.
- 23a. Leaves less than 2.5 cm long, apex of lobes rounded 2. *B. andrieuxii*
- 23b. Leaves 5 cm long or longer, apex of lobes obtuse to caudate.
- 24a. Petals light sulfur-yellow; fruits 5–7 cm long 5. *B. cookii*
- 24b. Petals white or pinkish with roseate center; fruits over 10 cm long.
- 25a. Calyx splitting to hypanthium into 2–5 lobes; petals with blades linear to filiform.
- 26a. Flower buds 4–5 cm long; fruits ca. 1 cm wide
..... 27. *B. unguata*
- 26b. Flower buds 7–10 cm long; fruits ca. 2 cm wide
..... 16. *B. multinervia*
- 25b. Calyx spathaceous; petals with blades ovate-elliptic.
- 27a. Staminal sheath distinctly ligulate 21. *B. picta*
- 27b. Staminal sheath not ligulate 3. *B. beguinotii*

1. *Bauhinia aculeata* L., Sp. Pl. 374. 1753; non Vell., 1825. TYPE: Colombia or Venezuela: *Herb. Clifford* (holotype, BM; photograph of holotype, IJ).

Bauhinia emarginata Mill., Gard. Dict. ed. 8. 1768; non Jack, 1822; nec Wall., 1831; nec Roxb. ex G. Don, 1832. TYPE: Colombia. Bolívar: Cartagena, *Houstoun s.n.* (holotype, BM; photograph of holotype, IJ, US).

Bauhinia rotundata Mill., Gard. Dict. ed. 8. 1768. TYPE: Colombia. Bolívar: Cartagena, *Houstoun s.n.* (holotype, BM; photograph of holotype, US).

Bauhinia unguata Jacq., Frag. Bot. 22. 1801; non Willd. ex Steud., 1840. TYPE: Venezuela: *Jacquin s.n.* (holotype, W, not seen).

Pauletia glandulosa H.B.K., Nov. Gen. Sp. Pl. 6: 314. 1824. *Bauhinia glandulosa* (H.B.K.) DC., Prodr. 2: 513. 1825. TYPE: Venezuela. Sucre: Cumaná, *Humboldt 47* (holotype, P, not seen; microfiche, MO; isotype, B(W), not seen; photograph of isotype, F, MO, NY, US).

Bauhinia bredemeyeri Vog., Linnaea 13: 302. 1839. TYPE: Venezuela. Federal District: Near Caracas, *Bredemeyer s.n.* (holotype, B, not seen; fragment of holotype, F; photograph of holotype, F, MO, NY, US).

Bauhinia unguata Willd. ex Steud., Nom. Bot. ed. 2. 1: 191. 1840, pro syn.; non Jacq., 1801.

Bauhinia mollicella Blake, Contr. Gray Herb. 53: 32. 1918. TYPE: Venezuela. Vicinity of Las Cumbres, *Curran & Hammon 1024* (holotype, GH, not seen; isotypes, NY, US).

Bauhinia miranda Pittier, Trab. Mus. Com. Venez. 1: 13. 1927. TYPE: Venezuela. Miranda: Los Mariques, on new road to Santa Lucía, *Pittier 11783* (holotype, VEN, not seen; isotypes, NY, P, US; photograph of NY isotype, NY).

Bauhinia mollifolia Pittier, Trab. Mus. Com. Venez. 1: 14. 1927. TYPE: Venezuela. Cojedes: Between San Rafael de Onoto and Agua Blanca, *Pittier*

11726 (holotype, VEN, not seen; isotypes, NY, US).

Bauhinia schultzei Harms, Repert. Spec. Nov. Regni Veg. 24: 210. 1928. TYPE: Colombia. Magdalena: Sierra Nevada de Santa Marta, upper Río Frío, *Schultze 428* (holotype, B, not seen; fragment of holotype, F; photograph of holotype, F, MO, NY, US).

Bauhinia albiflora Britt. & Rose, N. Amer. Fl. 23: 203. 1930. TYPE: El Salvador. Sonsonate: Vicinity of Sonsonate, *Standley 22373* (holotype, US; isotype, NY).

Shrubs or small trees up to 8(–10) m tall; branches tomentose when young, soon glabrate, armed with 1–2 intrastipular spines up to 1 cm long. Leaves chartaceous, suborbicular to broadly lanceolate, emarginate or bilobate for $\frac{1}{3}$, rarely to $\frac{1}{2}$ their length, lobes parallel or slightly divergent, 3–6 cm long, 2.5–5.0 cm wide, base cordate to rounded, apex of lobes rounded to acute, margins smooth, tomentose, strigose or glabrate on both surfaces, 7–9-nerved; petiole 0.5–3.0 cm long, slightly canaliculate, tomentose, strigose, or glabrate; stipules linear, ca. 4 mm long, caducous; adpetiolar intrastipular excrescence forming a frequently reflexed spine, others minute. Inflorescences short racemose, less commonly geminate or 1-flowered, subterminal, axillary, racemes 3–10-flowered, rachis tomentose, strigose, or glabrate, buds linear-lanceolate 3–4 cm long, tomentose, strigose, or glabrate, free tips up to 1.5 mm long; bract linear, 2–5 mm long; bracteoles similar to bract; pedicels 0.5–1.0 cm long, tomentose or strigose; hypanthium tubular, 0.3–1.0 cm long; calyx spathaceous at anthesis; petals 5, subequal, white, 3–8(–10) cm long, blade

narrowly elliptic to obovate, 2–10 times as long as claw, (0.5–)1.0–2.5 cm wide, glabrous, claw sparsely pilose to glabrous; fertile stamens 10, ca. $\frac{4}{5}$ the length of petals, 5 alternate ones shorter, filaments slender, arcuate, sparsely pilose at base, short-connate at base for 1–5 mm, anthers linear, 4–7 mm long; pollen spheroid, inaperturate, sexine reticulate with clavate supracteal processes; gynoecium nearly equalling stamens, arcuate, ovary and gynophore densely pilose, style glabrate, gynophore nearly equalling to $\frac{1}{2}$ as long as style, stigma capitate. Fruit linear to narrowly elliptic, apiculate with persistent style, 7–15 cm long, 1.5–2.5 cm wide, light brown, pubescent at maturity, sometimes becoming glabrate in age, gynophore 1–2 cm long, puberulent; seeds oblong to suborbicular, 6–11 mm long, 5–8 mm wide surface dull, dark brown, funicular aril-lobe scars equal, 2.0–2.5 mm long.

Bauhinia aculeata consists of two subspecies, the typical form, to which the Middle American material is referred, and subsp. *grandiflora* (Juss.) Wunderlin, which occurs in Bolivia, Ecuador, and Peru. The latter is distinguished by larger leaves, fruits, and by flowers with a conspicuously elongated hypanthium. In Middle America *B. aculeata* is native to El Salvador and Panama in Central America and Barbados and Grenada in the Lesser Antilles. It is also known from Antigua as an escape from cultivation. Outside Middle America, this species is native to Colombia and Venezuela where it is especially common. The species is found at elevations ranging from near sea level up to 1,700 m in open tropical deciduous forest or in disturbed sites. It flowers throughout the year but most abundantly from March to June. It is sometimes cultivated within and outside its natural range as an ornamental.

The taxonomy of the *B. aculeata* complex is still only partly understood; there are a number of names applied to entities in South America that may or may not be distinct. *Bauhinia aculeata* is closely related to about 30 additional South American and two Old World species. Britton and Rose described *Bauhinia albiflora* as having five fertile stamens, but an examination of the type material revealed it to have ten

Bauhinia aculeata is highly polymorphic as is evidenced by the extensive synonymy. However, it is easily distinguished from all other Middle American species because it is the only spiny species with large, white, showy flowers and ten

fertile stamens. The only other spiny species in Middle America, *B. pauletia*, has inconspicuous green flowers with filiform petals and only five fertile stamens.

Bauhinia aculeata is believed to be bat-pollinated and possibly also moth-pollinated, as appear to be many of its allies in South America.

In Venezuela this species is known as "Pata de Vaca," "Dibrito," "Quimbrapoto," "Guarapa," or "Urapa."

Representative specimens: EL SALVADOR. SAN MIGUEL: Vicinity of San Antonio N of Ciudad Barrios, *Allen & Armour 6867* (F). SONSONATE: Vicinity of Acajutla, *Standley 21983* (NY, US). PANAMA. COCLÉ: La Pintada, *León 12* (MO). PANAMÁ: E of Pacora, *Woodson et al. 735* (MO, NY, US). ANTIGUA. Upper Cedar Hill, *Box 1193* (F, UC, US). BARBADOS. St. Thomas, Hopewell Gully, *Bovell 208* (UCWI). GRENADA. St. George's, *Broadway s.n.* (F, NY, US).

2. *Bauhinia andreuxii* Hemsl., *Diag. Pl. Nov.* 48. 1880. TYPE: Mexico. Oaxaca: Near Oaxaca, *Andrieux 411* (holotype, K; isotypes, G, not seen, P; fragment of G isotype, F; photograph of G isotype, F, MO, US).

Shrubs or small trees; branches tuberculate, tomentose when young, soon glabrate. Leaves chartaceous, suborbicular or broader than long, bilobate up to $\frac{1}{2}$ their length, lobes slightly divergent, 1.0–2.2 cm long, 1.5–3.0 cm wide, base cordate to rounded, apex of lobes rounded, upper surface glabrous, lower surface tomentellous, 7–9-nerved; petiole 5–15 mm long, slightly canaliculate, tomentellous; stipules ovate, ca. 1 mm long, caducous; adpetiolar intrastipular excrescence fused and forming a subulate projection ca. 1 mm long, others minute. Inflorescences racemose, congested, terminal, 3–8-flowered, rachis strigose or tomentellous, buds linear-lanceolate, 12–18 mm long, strigose or tomentellous, free tips ca. 1.5 mm long; bract lanceolate, ca. 1.5 mm long; bracteoles similar but slightly smaller than bract; pedicels ca. 5 mm long, strigose or tomentellous; hypanthium cyathiform, 2–3 mm long; calyx spathaceous at anthesis; petals 5, subequal, white, broadly elliptic, ca. 1 cm long, blade 4–6 mm wide, glabrous, claw ca. 1 mm long, glabrous; fertile stamens 10, 5 nearly equalling petals, alternate 5 ca. $\frac{1}{2}$ the length of petals, unequally short-connate at base for 1–3 mm, filaments slender, glabrous, anthers linear oblong, ca. 2 mm long on longer stamens, ca. 1.5 mm long on shorter stamens; pollen spheroid, inaperturate, sexine reticulate with blunt, spinelike, in-

fractectal processes; gynoecium nearly equalling petals, tomentose, gynophore nearly equalling style in length, stigma capitate. Fruit linear, apiculate with persistent style, 8–10 cm long, ca. 1.5 cm wide, dark brown, tomentose; seeds not seen.

Bauhinia andrieuxii is a wide-ranging but infrequently collected species occurring in western Mexico from Sinaloa to Oaxaca. It occurs in deciduous thorn scrub at elevations from near sea level up to around 1,800 m.

This species is distinguished from other species of *Bauhinia* with ten fertile stamens in the area by its small leaves, which are suborbicular or broader than long. It is most closely related to *B. seleriana*.

The pollinators of this species are probably butterflies or possibly bees.

Specimens examined: MEXICO, MORELOS: Cañón de Lobos, Km 14 on Cuernavaca-Yautepec road, *Fryxell* 764 (MEXU); Cañón de Lobos, *Vázquez* 1776 (MEXU). OAXACA: Monte Albán, *Rose & Hough* 4590 (NY, US); *Sousa et al.* 6077 (MEXU, MO); Mitla, *Smith* 107 (US). SINALOA: Cerro Llano Redondo, W of Caimanero, *Gentry* 7018 (NY). Without precise locality: *Andrieux* 371 (P).

3. *Bauhinia beguinotii* Cuf., Arch. Bot. Sist. 9: 192. 1933. TYPE: Costa Rica. Limón: Between Waldeck and Río Barbilla, *Cufodontis* 664 (holotype, W, not seen; photograph of holotype, F, MO, US).

Shrubs or small trees up to 6 m tall; branches brown tomentose to tomentellous when young, soon glabrate. Leaves chartaceous, oblong-ovate, entire to shallowly bilobate, 10–24 cm long, 5–16 cm wide, base rounded to truncate, apex of entire leaf or lobes acuminate to caudate, upper surface glabrous, lower surface brown tomentellous to glabrate, 7–9-nerved; petioles 1.5–3.5 cm long, slightly canaliculate, glabrate; stipules broadly ovate, apiculate, 1.0–1.5 mm long, persistent; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1 mm long, others minute. Inflorescences racemose, terminal, or subterminal and axillary, racemes 5–10-flowered, rachis brown tomentose to tomentellous, buds elliptic-lanceolate, 1.5–2.0 cm long, brown tomentose, free tips minute; bract ovate, ca. 1 mm long; bracteoles similar to bract; pedicels 2–5 mm long, brown tomentose; hypanthium campanulate, 5–6 mm long; calyx spatheous at anthesis; petals 5, subequal, white, 2.5–3.0 cm long, blade oblanceolate, 8–13 mm wide, glabrous, claw 3–5 mm long, glabrous; fer-

tile stamens 10, the 5 longer $\frac{3}{4}$ the length to nearly equalling the petals, alternate 5 stamens shorter, short-connate for ca. $\frac{1}{2}$ the length of shorter stamens, filaments sparsely pilose toward base, anthers triangular at anthesis, ca. 3 mm long on longer stamens, ca. 2 mm long on shorter stamens, sparsely pilose to glabrate; pollen spheroid, inaperturate, sexine reticulate with blunt, spinelike processes; gynoecium nearly equalling longer stamens, brown tomentose, gynophore nearly equalling style, stigma capitate. Fruit linear, apiculate with persistent style, 12–15 cm long, 2 cm wide, brown, minutely strigose to glabrate, gynophore 1.0–1.5 cm long, glabrate; seeds not seen.

Bauhinia beguinotii is a rare species known in Middle America only from Costa Rica and Panama, where it occurs in tropical evergreen forest at elevations from near sea level up to about 400 m.

Bauhinia beguinotii is a member of the *Petiolata* alliance, which is essentially a South American group and includes *B. petiolata* and *B. cookii*. It is less closely related to *B. pansamalana*, also of this alliance, and differs in having ten rather than three fertile stamens. *Bauhinia beguinotii* is distinguished from *B. petiolata*, its most closely related species in Central America, by shorter stamens connate for about half their length rather than being free nearly to the base and by leaves with the inner pair of nerves closer to the midrib than to the outer adjacent nerves rather than equidistant or closer to the outer nerves.

Bauhinia beguinotii is known outside Middle America only from Gorgona Island, Nariño Province, Colombia. The Colombian material is recognized as var. *gorgonae* (Killip ex Cowan) Wunderlin and is distinguished by leaves deeply bilobate or bifoliolate rather than entire or only slightly bilobate. Since the degree of lobing in leaves of *Bauhinia* is often quite variable, further collections may prove var. *gorgonae* not to be distinct from the typical form found in Panama and Costa Rica.

Specimens examined: COSTA RICA, LIMÓN: Drainage of the Río Estrilla Valley, *Shank & Molina* 4466 (F, US). PANAMA, PANAMÁ: El Llano-Cart-Tupile road, 16 km N of Pan-American Highway at El Llano, *Nee* 9362 (MO); 14.8 km N of the Pan-American Highway, *Folsom & Maas* 5202 (MO); ca. 10 km N of Pan-American Highway, *Nee et al.* 8881 (MO); 10–12 km N of Pan-American Highway, *Mori & Kallunki* 2847 (MO).

4. *Bauhinia chapulhuacania* Wunderlin, nom. nov. *Bauhinia dipetala* var. *macrophylla* Wunderlin, Southwest. Nat. 13: 104. 1968. TYPE: Mexico. Hidalgo: Near Chapulhuacan, Moore 2883 (holotype, GH).

Trees up to 6 m tall; branches strigose when young, soon glabrate. Leaves subcoriaceous, broadly ovate, bilobate about $\frac{1}{4}$ – $\frac{1}{3}$ their length, lobes slightly divergent, (6–)10–15(–30) cm long, (5–)10–15(–25) cm wide, base cordate, apex of lobes rounded to obtuse, margins smooth or nearly so, upper surface glabrous, lower surface minutely brown strigose below when young, glabrate in age, 11-nerved, petiole 2.5–4.0 cm long, slightly canaliculate, brown strigose; stipules ovate-lanceolate, 2.0–2.5 mm long, persistent; adpetiolar intrastipular excrescence enlarged and forming a subulate projection ca. 1.5 mm long, others minute. Inflorescence racemose, terminal, or subterminal and axillary, 20–30-flowered, rachis strigose, buds linear, 2–3 cm long, strigose, free tips up to 2 mm long; bract lanceolate, ca. 1.5 mm long; bracteoles similar to bract but smaller; pedicels 1.0–1.5 cm long, strigose; hypanthium elongate-campanulate, 6–10 mm long; calyx spathaceous at anthesis; petals 2, subequal, linear, tapering to base, 1.0–2.0 cm long, 0.5–1.5 mm wide, brown pilose on inner surface; fertile stamen 1, 2.5–4.0 cm long, filament slender, arcuate, glabrate, short-connate at base with staminodes, anther linear-oblong, green, 8–12 mm long, glabrate; staminodes 9, subequal, 4.5–13.0 mm long, connate for ca. $\frac{3}{4}$ their length, brown pilose on inner surface, abortive anthers absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate with elongate suprategal processes; gynoecium ca. equalling fertile stamen, arcuate, tomentose, style and gynophore sparsely tomentellous, gynophore ca. equalling style, stigma subclavate, hardly differentiated from style. Fruit linear, apiculate with persistent style, (15–)18–25(–30) cm long, 1.5–2.0 cm wide, dark brown, sparsely brown strigose, gynophore 2.5–4.0 cm long; seeds broadly oblong, 10–12 mm long, 8–10 mm wide, surface dull, dark brown, funicular aril-lobe scars subequal, ca. 3 mm long.

Bauhinia chapulhuacania is a rare species endemic to southeastern San Luis Potosí and northernmost Hidalgo, Mexico where it occurs in open, mixed, mesic forest at 700 to 900 m elevation.

This species is most closely related to *B. dipetala* and *B. deserti*, both of which are characterized by two inconspicuous green petals. *Bau-*

hinia chapulhuacania occurs over 100 miles to the north of the range of these other two related species and differs in larger leaves and fruits. Because of the close resemblance of its flower to that of *B. dipetala*, *B. chapulhuacania* was originally described as a variety of that species. However, examination of additional collections indicates that it is best treated as a distinct but closely related species and it is here elevated to specific rank. Since the name *B. macrophylla* is preoccupied (*B. macrophylla* Poir., Encyc. Suppl. 1: 600. 1810 [= *B. guianensis* Aubl.]), a new name must be chosen.

Bauhinia chapulhuacania is undoubtedly bat-pollinated as are its close relatives *B. deserti* and *B. dipetala*.

Specimens examined: MEXICO. HIDALGO: S of Tama-zunchale, Barkley & Webster 7264 (F, MEXU, TEX); near Hidalgo-San Luis Potosí border, Km 343–344 on highway below Chapulhuacan, Moore & Wood 3652 (MEXU, UC, US); 7 mi. S of Chapulhuacan along MEX 85, Wunderlin 5050 (MO, USF). SAN LUIS POTOSÍ: 31 mi. S of Ciudad Valles along Highway 85, McGregor et al. 857 (US); Puerto Verde, 64 km W of Ciudad Valles on highway to Río Verde, Fryxell & Anderson 3605 (MO, USF); near the waterfall at El Salto, King 3920 (F, NY, TEX, UC, US).

5. *Bauhinia cookii* Rose in Britt. & Rose, N. Amer. Fl. 23: 205. 1930. TYPE: Costa Rica. Alajuela: Cuesta de la Vieja, road to San Carlos, Cook & Doyle 41 (holotype, US; fragment of holotype, NY; isotype, US).

Casparia calderonii Rose in Britt. & Rose, N. Amer. Fl. 23: 217. 1930. *Bauhinia calderonii* (Rose) Lundell, Phytologia 1: 214. 1937. *Bauhinia calderonii* (Rose) Standl. & Steyerl., Publ. Field, Mus. Nat. Hist., Bot. Ser. 23: 161. 1944. Superfluous combination for *Bauhinia calderonii* (Rose) Lundell. TYPE: El Salvador. Sonsonate: San Julián, Calderón 2226 (holotype, US; isotype, US; fragment of isotype, NY).

Bauhinia gigas Lundell, Phytologia 1: 213. 1937. TYPE: Belize. El Cayo: Valentín, Lundell 6298 (holotype, MICH; isotypes, NY, US).

Trees up to 15(–40) m tall; branches strigose or puberulent when young, soon glabrate. Leaves submembranaceous or chartaceous, broadly ovate, bilobate for $\frac{1}{2}$ or more their length, lobes divaricate, 5–10(–15) cm long, 7–10(–12) cm wide, base cordate to truncate, apex of lobes acute to obtuse, margins smooth, upper surface glabrous, lower surface strigose, at least on nerves, 7–9-nerved; petioles 2–3(–5) cm long, slightly canaliculate, strigose; stipules lanceolate, ca. 1.5 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate pro-

jection up to 1.5 mm long, others minute. Inflorescences paniculate, congested into fasciculate clusters, sometimes produced before the leaves and appearing cauliflorous or ramiflorous, 15–60-flowered, rachis and rachilla strigose, buds linear-elliptic, 8–10 mm long, strigose, free tips minute; bract ovate-lanceolate, ca. 1 mm long; bracteoles similar but slightly smaller than bract; pedicels 5–7 mm long, strigose; hypanthium cyathiform, 2–3 mm long; calyx spathaceous at anthesis; petals 5, subequal, light sulfur-yellow, elliptic to oblanceolate, sessile or short clawed, 10–15 mm long, 5–7 mm wide, glabrate; fertile stamens 10, 5 nearly equalling petals, alternate ones ca. $\frac{1}{2}$ their length, glabrate, short-connate at base for ca. 1 mm, laciniate rim projecting above point of adnation, filaments slender, anthers linear-oblong, those of longer stamens ca. 2 mm long, of shorter stamens ca. 1.5 mm long; pollen spheroid, inaperturate, sexine reticulate with blunt, spinelike infratectal processes; gynoecium ca. $\frac{1}{2}$ the length of petals and ca. equalling shorter stamens, gynophore ca. equalling style, stigma small, capitate. Fruit linear, apiculate with persistent style, 5–7 cm long, ca. 1.5 cm wide, light brown, glabrous, gynophore 5–10 mm long; seeds obovate, 7–10 mm long, 5–8 mm wide, surface dull, dark brown, funicular aril-lobe scars equal, forming an arcuate white line for ca. $\frac{4}{5}$ the length of seed.

Bauhinia cookii is widespread species from Sinaloa in western Mexico southeast to Costa Rica. Collections have not been seen from Nicaragua, but it is to be expected there. It occurs in tropical deciduous or semideciduous forests at elevations from near sea level up to about 2,000 m but more commonly from 300 to 1,000 m. It apparently flowers throughout the year but most commonly from March to July. Flowers are sometimes produced before the leaves appear or are much developed.

This species is part of the Petiolata alliance but does not appear to be closely related to any of the other species of this alliance in Central America. It is easily recognized in Middle America because it is the only tree *Bauhinia* with light sulfur-yellow flowers in fasciculate clusters along the branches.

In Guatemala and El Salvador the local name is "Pata de Venado."

Representative specimens: MEXICO. CHIAPAS: Vicinity of La Chacona, *Miranda* 6485 (US). COLIMA: Ca. 14 mi. WNW of Santiago on road to Cihuatlán, Jalisco,

McVaugh 20776 (MICH, US). GUERRERO: Cañón de la Mano Negra, near Iguala, *Rose et al.* 9344 (F, GH, NY, US). JALISCO: Between Bahía Navidad and La Manzanilla on Bahía Tenacatita, 3 mi. W of Autlán-Navidad road, *McVaugh* 21007 (MICH). NAYARIT: 7–8 mi. W of Compostela along road to Mazatan, *Gentry & Gilly* 10848 (DUKE, MEXU, TEX). OAXACA: Ejido Benito Juárez, Sebástopol, Textepec, *Dioscorea Brigade* 2741 (MEXU). SINALOA: Mazatlán, *Reko* 4520 (MEXU, US). VERACRUZ: Municipio Puente Nacional, La Ceiba, *Ventura* 12760 (MEXU). GUATEMALA. ESCUINTLA: Río Guacalate, *Standley* 60187 (F, US). RETALHULEU: Río Talculán, 5 mi. W of Retalhuleu, *Standley* 87377 (F). SUCHITEPÉQUEZ: Along Río Madre Vieja above Patulul, *Standley* 62207 (F). HONDURAS. COMAYAGUA: Pito Solo, Lake Yojoa, *Edwards P-404* (F, US). COSTA RICA. ALAJUELA: Plains of the Río San Carlos, *Pittier* 16695 (US). SAN JOSÉ: Cerro Bijaqualito-Tarcoles, *Póveda* 1097 (MO).

6. *Bauhinia coulteri* Macbr., Contr. Gray Herb. 59: 22. 1919. Based on *Bauhinia platypetala* Benth. ex Hemsl.

Shrubs to 0.8 m or small tree up to 6 m tall; branches tomentose when young, soon glabrate. Leaves subcoriaceous, suborbicular, bilobate up to $\frac{1}{3}$ their length, (2–)3–5(–6) cm long, (2–)3–5(–6) cm wide, base cordate, apex of lobes rounded, margins smooth to strongly crisped, upper surface glabrous, lower surface tomentose to glabrate, 5–9-nerved; petiole 1–2 cm long, slightly canaliculate, tomentose; stipules lanceolate, ca. 1 mm long, caducous; intrastipular excrescences minute. Inflorescences racemose, terminal, or subterminal and axillary, 2–10-flowered, rachis tomentose, buds narrowly lanceolate, 1.5–2.5 cm long, reddish tomentose, free tips ca. 1 mm long; bract narrowly lanceolate, 2.0–2.5 mm long; bracteoles similar but smaller than bract; pedicels slender, 1–2 cm long, tomentose; hypanthium cyathiform, 1–2 mm long; calyx spathaceous at anthesis; petals 5, subequal, pink or rarely white with darker venation, narrowly elliptic, sessile, (1–)2–3(–4) cm long, 0.5–1.5 cm wide, glabrous or strigulose near base on inner surface; fertile stamens 3, short-connate with staminodes, central stamen ca. $\frac{1}{2}$ as long as petals, filament stout, anther oblong, ca. 2 mm long, glabrous, lateral stamens 5–7 mm long, filaments stout, glabrous, anthers as in central stamen; staminodes 7, subequal, 4–6 mm long, connate for ca. $\frac{1}{2}$ their length, glabrous, abortive anthers present; pollen spheroid, 3-colporoidate, sexine reticulate; gynoecium ca. equalling petals, arcuate, strigose, gynophore subequalling style, stigma not much differentiated from style. Fruit linear, apiculate with persistent style, (5–)6–8(–15)

cm long, 1.0–1.5 cm wide, light brown, tomentellous to glabrate, gynophore ca. 1–2 cm long, tomentellous; seeds elliptic, 7–8 mm long, 4–5 mm wide, dark brown, funicular aril-lobe scars subequal, 2–3 mm long.

Two varieties are recognized.

KEY TO VARIETIES OF *BAUHINIA COULTERI*

- 1a. Shrubs up to 0.8 m tall; leaves subglabrous or sparsely pubescent below, margins smooth 6a. var. *coulteri*
 1b. Small trees 5–6 m tall; leaves densely tomentose below, margins crisped 6b. var. *arborescens*

6a. *Bauhinia coulteri* Macbr. var. *coulteri*.

Bauhinia platypetala Benth. ex Hemsl., *Diag. Pl. Nov.* 49. 1880; non Burch. ex Benth., 1870. TYPE: Mexico. Hidalgo: Zimapán, *Coulter 531* (holotype, K; isotype, NY).

Casparia coulteri (Macbr.) Britt. & Rose, *N. Amer. Fl.* 23: 216. 1930.

Bauhinia coulteri forma *albiflora* Wunderlin, *Rhodora* 70: 286. 1968. TYPE: Mexico. Tamaulipas: 19 km SE of Miquihuana on road to Palmillas, *Stanford et al. 851* (holotype, MO; isotypes, GH, NY, UC).

Bauhinia coulteri is a central Mexican species of open oak-pine, juniper, or deciduous forests and occurs at elevations of 600 to 2,400 m. It flowers from April to September.

This species is easily recognized by its suborbicular leaves and pink (rarely white), sessile petals, and three fertile stamens. No other species of *Bauhinia* in Mexico has three fertile anthers. It is readily distinguished from var. *arborescens* by the characters given in the above key.

Representative specimens: MEXICO. HIDALGO: 16 km S of Jacala, *Frye & Frye 2251* (GH, MO, NY, UC, US). QUERÉTARO: 12 mi. E of Landa de Matamoros, *Crutchfield & Johnston 6136a* (TEX). SAN LUIS POTOSÍ: Minas de San Rafael, *Purpus 5187* (F, GH, MO, NY, P, UC, US). TAMAULIPAS: 18 mi. by road SE of Bustamante toward La Presita and Tula, *Johnston et al. 11154* (TEX).

6b. *Bauhinia coulteri* var. *arborescens* Wunderlin, *Phytologia* 15: 120. 1967. TYPE: Mexico. Querétaro: Ca. 80 km NE of Querétaro, above Pilón on road to Pinal de Arnoles, *McVaugh 10351* (holotype, MO; isotypes, DUKE, LL, MICH, TEX, US).

Bauhinia coulteri var. *arborescens* is known only from the type collection. It occurs in the lower limits of the pinyon pine-juniper belt at about 2,700 meters elevation. It was collected in flower in April.

This variety is easily distinguished from the typical by the characters in the above key.

The local name is "Manito de Cabra."

7. *Bauhinia deserti* (Britt. & Rose) Lundell, *Publ. Carnegie Inst. Wash.* no. 478. 211. 1937. *Casparia deserti* Britt. & Rose, *N. Amer. Fl.* 23: 216. 1930. *Bauhinia dipetala* var. *deserti* (Britt. & Rose) Wunderlin, *Phytologia* 15: 53. 1967. TYPE: Mexico. Puebla: Near Tehuacán, *Rose & Rose 11375* (holotype, US; isotype, NY).

Shrubs to 5 m tall; branches strigose or puberulent when young, soon glabrate. Leaves subcoriaceous, broadly ovate, bilobate $\frac{1}{2}$ to $\frac{2}{3}$ their length, lobes parallel or slightly divergent, (3–)5–8(–12) cm long, (3–)5–8(–12) cm wide, base cordate, apex of lobes rounded or obtuse, margins slightly crisped, upper surface glabrous, lower surface puberulent, 7–11-nerved; petiole 2–4 cm long, slightly canaliculate, puberulent; stipules ovate, 1.2–2.0 mm long, persistent; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1.5 mm long, others minute. Inflorescences racemose, terminal, or subterminal and axillary, 20–30-flowered, rachis strigose, buds linear, 2–3 cm long, strigose, free tips up to 2 mm long; bract lanceolate, ca. 1.5 mm long; bracteoles similar to bract, but smaller; pedicels 0.6–1.5 mm long, strigose; hypanthium elongate-campanulate, 6–8 mm long; calyx spatheaceous at anthesis; petals 2, subequal, linear, tapering to base, 1–2 cm long, brown pilose on inner surface; fertile stamen 1, 2.5–4.0 cm long, filament slender, arcuate, glabrous, short-connate with staminodes at base, anther linear-oblong, green, 8–12 mm long, glabrous; staminodes 9, subequal, 8–12 mm long, connate for ca. $\frac{3}{4}$ their length, brown pilose externally, abortive anthers absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate with elongate supracteal processes; gynoecium ca. equalling stamen, arcuate, ovary tomentose, style and gynophore tomentellous, gynophore ca. equalling style, stigma subclavate, hardly differentiated from style. Fruit linear, apiculate with persistent style, 10–18 cm long, ca. 1 cm wide, dark brown, sparsely strigose, gynophore 2.5–3.5 cm long; seeds oblong, 8–10 cm long, 5–8 cm wide, surface dull, dark brown, funicular aril-lobe scars subequal, ca. 3 mm long.

Bauhinia deserti is restricted to the states of Oaxaca and Puebla in Mexico in dry deciduous forest at elevations of about 1,000 to 1,900 m.

It apparently flowers throughout much of the year but most abundantly from August to November.

Bauhinia deserti is most closely related to *B. chapulhuacania* and *B. dipetala*; all three are characterized by green flowers with two petals. It is distinguished from *B. chapulhuacania* by its smaller leaves and fruits and from *B. dipetala* by its coriaceous leaves with the apex of the lobes usually rounded to obtuse. *Bauhinia deserti* is geographically separated from *B. chapulhuacania* and occurs in a dryer habitat than *B. dipetala*. *Bauhinia deserta* was reduced to a variety of *B. dipetala* by Wunderlin (1967) but examination of additional collections leads to the conclusion that it should be retained at the specific level.

This species is believed to be bat-pollinated, as are the related *B. chapulhuacania* and *B. dipetala*.

Representative specimens: MEXICO. OAXACA: Monte Albán, near Oaxaca, *Pringle 6065* (A, F, MO, MSC, NY, P, UC, US, VT). PUEBLA: Tehuacán, *Purpus 1190* (F, GH, MO, NY, UC).

8. *Bauhinia dipetala* Hemsl., *Diag. Pl. Nov.* 1880. *Casparia dipetala* (Hemsl.) Britt. & Rose, *N. Amer. Fl.* 23: 216. 1930. TYPE: Mexico. Veracruz: Valle de Córdoba, *Bourgeau 1713* (holotype, K; isotypes, F, GH, P, US).

Bauhinia unilateralis Britten & Baker, *J. Bot.* 35: 233. 1897. *Casparia unilateralis* (Britten & Baker) Britt. & Rose, *N. Amer. Fl.* 23: 214. 1930. TYPE: Mexico. Veracruz: Veracruz, *Houstoun s.n.* (holotype, BM).

Shrubs or small trees up to 5 m tall; branches strigose or puberulent when young, soon glabrate. Leaves chartaceous, broadly ovate, bilobate about $\frac{1}{3}$, rarely to $\frac{1}{2}$ their length, lobes parallel to slightly divergent, (3-)5-8(-12) cm long, (3-)5-8(-12) cm wide, base rounded to cordate, apex of lobes acute to obtuse, margins smooth or slightly crisped, upper surface glabrous, lower surface strigose or puberulent, 7-11-nerved; petiole 1.5-3.0 cm long, slightly canaliculate, strigose or puberulent; stipules lanceolate, ca. 1.5 mm long, persistent; adpetiolar intrastipular excrecence enlarged and forming a subulate projection up to 1.5 mm long, others minute. Inflorescence racemose, terminal, or subterminal and axillary, 20-30-flowered, rachis strigose, buds linear, 1.0-1.5 mm long, strigose, free tips up to ca. 1 mm long; bract lanceolate, ca. 1.5 mm long; bracteoles similar to bract but smaller; pedicels

ca. 5 mm long, strigose; hypanthium elongate-campanulate, 4-6 mm long; calyx spathaceous at anthesis; petals 2, subequal, linear, 6-8 mm long, ca. 2 mm wide, brown pilose on inner surface; fertile stamen 1, 2.0-2.5 cm long, filament slender, arcuate, glabrate, short-connate at base with staminodes, anther linear-oblong, green, 8-10 mm long, sparsely brown pilose, staminodes 9, subequal, 3-4 mm long, connate for $\frac{3}{4}$ or more their length, brown pilose on inner surface, abortive anthers absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate with elongate supratectal processes; gynoecium ca. equalling stamen, arcuate, ovary tomentose, style and gynophore tomentellous to glabrate, gynophore ca. equalling style, stigma subclavate, hardly differentiated from style. Fruit linear, apiculate with persistent style, (8-)10-15(-18) cm long, 1.0-1.5 cm wide, dark brown, puberulent to glabrate, gynophore 2.0-2.5 cm long; seeds oblong, 7-8 mm long, 6-7 mm wide, surface dull, dark brown, funicular aril-lobe scars subequal, ca. 3 mm long.

Bauhinia dipetala occurs in southern Mexico and Belize along the edges of moist deciduous forest at elevations of 200 to 1,100 m. It has not been collected in Petén, Guatemala, but is to be expected there. It is sometimes cultivated as an ornamental and has become naturalized in Cuba. It flowers from December to May.

Bauhinia dipetala is most closely related to *B. deserti* and *B. chapulhuacania*, which also have green flowers with two petals.

The species has green flowers with a musky odor, which are bat-pollinated.

Representative specimens: MEXICO. CHIAPAS: Along a small river in the barrio of Tih Ha', paraje of Mah-benchauk, municipio of Tenejapa, *Ton 2050* (F, MSC, US). MORELOS: Oaxtepec, *Miranda 1209* (MEXU). OAXACA: Near Oaxaca, *Andrieux 2112* (P). PUEBLA: Tehuacán, *Diguet s.n.* (P). VERACRUZ: Ca. 10 mi. E of Córdoba, Highway 150, *Long & Burch 3125* (USF). BELIZE. CAYO: Banks of river above El Cayo, *Lundell 6136* (F, MICH, NY, TEX, US). CUBA. HAVANA: Near Havana, *León 6241* (NY).

9. *Bauhinia divaricata* L., *Sp. Pl.* 374. 1753; non Lam., 1785; nec Hort. ex Steud., 1840. *Mandarus divaricatus* (L.) Raf., *Sylva Tellur.* 122. 1838. *Casparia divaricata* (L.) H.B.K. ex Jackson in *Index Kew.* 1: 449. 1895, nom. inval. *Casparia divaricata* (L.) H.B.K. ex Britt. & Rose, *N. Amer. Fl.* 23: 215. 1930. TYPE: ?Jamaica: *Herb. Clifford* (holotype, BM).

- Bauhinia divaricata* [var.] *beta* L., Sp. Pl. ed. 2. 535. 1762. TYPE: ?Jamaica: *Herb. Miller* (holotype, BM).
- Bauhinia aurita* Ait., Hort. Kew. 2: 48. 1789. *Casparia aurita* (Ait.) Griseb., Fl. Brit. W. Ind. 213. 1860. Based on *Bauhinia divaricata* [var.] *beta* L.
- Bauhinia divaricata* Lam., Encyc. 1: 389. 1785; non L., 1753; nec Hort. ex Steud., 1840. TYPE: ?Jamaica: *Herb. Desfontaines* (holotype, FI, not seen).
- Bauhinia porrecta* Sw., Prodr. 66. 1788. *Casparia porrecta* (Sw.) Kunth ex Griseb., Fl. Brit. W. Ind. 213. 1860. *Casparia porrecta* (Sw.) H.B.K. ex Jackson in Index Kew. 1: 449. 1895, nom. inval. TYPE: ?Jamaica: *Swartz s.n.* (holotype, ?S, not seen).
- Bauhinia latifolia* Cav., Icon. 5: 4. 1799. *Casparia latifolia* (Cav.) H.B.K. ex Jackson in Index Kew. 1: 449. 1895, nom. inval. TYPE: Mexico: *Nee s.n.* (holotype, MA, not seen).
- Bauhinia retusa* Poir., Encyc. Suppl. 1: 599. 1811; non Ham. ex Roxb., 1832. TYPE: *Herb. Jussieu* (holotype, P-JU, not seen).
- Bauhinia racemifera* Desv., J. Bot. 3: 74. 1814. TYPE: America. *Herb. Desvaux* (holotype, P).
- Bauhinia americana* Laun., Herb. Amat. 5: t. 315. 1821. TYPE: Tropical America. *Herb. Launay* (holotype, P-JU, not seen).
- Bauhinia lamarkiana* DC., Prodr. 2: 512. 1825. Based on *Bauhinia divaricata* Lam.
- Bauhinia spathacea* DC., Prodr. 2: 512. 1825. *Casparia spathacea* (DC.) Britt. & Rose, N. Amer. Fl. 23: 211. 1930. TYPE: Based on a Sessé and Mociño plate (copy, G, not seen; photograph of copy at G, F, MO, US; blueprint of tracing of copy at G, MO, US).
- Bauhinia furcata* Desv., Ann. Sci. Nat. (Paris) 9: 429. 1826. *Casparia furcata* (Desv.) Jackson in Index Kew. 1: 449. 1895, nom. inval. TYPE: Tropical America. *Herb. Desvaux* (holotype, P).
- Bauhinia adansoniana* Guill. & Perr. Fl. Seneg. Tent. 1: 265. 1832. TYPE: The Adanson specimen is synonymous with *B. rufescens* Lam. of Africa but the description is of *B. divaricata* (fide Pellegrin, 1927).
- Bauhinia versicolor* Bertol., Hort. Bonon. Pl. Nov. 1: 7. 1838. *Casparia versicolor* (Bertol.) Britt. & Rose, N. Amer. Fl. 23: 215. 1930. TYPE: Mexico. Tamulipas: Cultivated from seeds collected by Boschio, *Bertoloni s.n.* (holotype, BOLO, not seen).
- Bauhinia mexicana* Vog., Linnaea 13: 299. 1839. *Casparia mexicana* (Vog.) Britt. & Rose, N. Amer. Fl. 23: 214. 1930. TYPE: Mexico. Veracruz: Near Papantla, *Schiede s.n.* (holotype, B, not seen, presumed destroyed).
- Bauhinia latifolia* [var.] *beta* Hook. & Arn., Bot. Cap. Beech. Voy. 421. 1840. TYPE: Mexico. Nayarit: San Blas and Tepic, *Lay & Collie s.n.* (holotype, ?GL, not seen).
- Bauhinia schlechtendaliana* Mart. & Gal., Bull. Brux. 10: 308. 1843. *Casparia schlechtendaliana* (Mart. & Gal.) Britt. & Rose, N. Amer. Fl. 23: 215. 1930. TYPE: Mexico. Oaxaca: Río de las Vueltas, *Gal-eotti 3239* (holotype, BR, not seen; isotype, P).
- Bauhinia amblyophylla* Harms in Loess., Bull. Herb. Boissier 7: 548. 1899. *Casparia amblyophylla* (Harms) Britt. & Rose, N. Amer. Fl. 23: 211. 1930. LECTOTYPE: Mexico. Oaxaca: Between Tequisistlán and Jalapa, *Seler 1689* (NY). LECTOTYPE here designated; selected from syntypes: *Seler 1689* and *1890*, B, destroyed in World War II.
- Bauhinia confusa* Rose, Contr. U.S. Nat. Herb. 10: 97. 1906. *Casparia confusa* (Rose) Britt. & Rose, N. Amer. Fl. 23: 215. 1930. TYPE: Mexico. San Luis Potosí: Tomasopo Canyon, *Pringle 3104* (holotype, US; isotypes, CM, F, GH, MO, MSC, NY, UC, US, VT).
- Bauhinia goldmanii* Rose, Contr. U.S. Nat. Herb. 10: 97. 1906. TYPE: Mexico. Chiapas: Tuxtla Gutiérrez, *Goldman 742* (holotype, US; fragment of holotype, NY).
- Bauhinia caribaea* Jennings, Ann. Carnegie Mus. 11: 127. 1917. TYPE: Cuba. Havana: N of Caleta Grande, *Jennings 630* (holotype, CM).
- Bauhinia peninsularis* Brandeg., Univ. Calif. Publ. Bot. 10: 183. 1922. *Casparia peninsularis* (Brandeg.) Britt. & Rose, N. Amer. Fl. 23: 211. 1930. TYPE: Mexico. Baja California Sur: W side of Cape region, *Brandegee s.n.* (holotype, UC).
- Bauhinia divaricata* var. *angustiloba* Ekman ex Urban, Ark. Bot. 24A: 8. 1931. TYPE: Haiti. Sud: Massif de la Hotte, western group, Tiburón, in hills at Cap-à-faux, *Ekman 10535* (holotype, B, destroyed in World War II; isotypes, F, LL, NY, US).

Shrubs or small trees up to 8 m tall; branches strigose or tomentellous when young, soon glabrate. Leaves chartaceous to subcoriaceous, suborbicular to narrowly ovate to lanceolate, emarginate to bilobate about $\frac{3}{4}$, rarely nearly their entire length, lobes parallel or divaricate, 2–12 cm long, 2–10 cm wide, base rounded to cordate, apex of lobes acuminate to rounded, margins smooth to slightly crisped, upper surface tomentellous, puberulent, or glabrous, lower surface strigose or tomentellous, 5–9-nerved, petiole 0.5–4.0 cm long, slightly canaliculate, strigose, tomentellous, or glabrate; stipules ovate to linear, 1–3 mm long, deciduous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 2 mm long, others minute. Inflorescence racemose, terminal, or subterminal and axillary, (10–)20–50-flowered, rachis strigose or tomentellous, buds linear, 12–20 mm long, strigose or tomentellous, free tips up to 2 mm long; bract lanceolate to linear, 1.5–4.0 mm long; bracteoles similar to bract but smaller; pedicels 0.5–2.0 cm long, strigose or tomentellous; hypanthium cyathiform, 2–3 mm long; calyx spathaceous at anthesis; petals 5, subequal, white, turning pink in age, 1.5–2.5 cm long, blade ovate to narrowly elliptic, 1–3 times the length of claw, 1.5–6.0 mm wide, glabrous, claw glabrous; fertile stamen 1, subequalling to twice the length of petals, filament slender, slightly arcuate, glabrous, connate at base with staminodes, anther linear-oblong, ca. 2 mm long, black, glabrous.

staminodes 9, subequal, 1.0–1.5 cm long, connate for $\frac{3}{4}$ or more their length, white, petaloid, abortive anthers present or absent; pollen subspheroid, 3-colporoidate, sexine striate; gynoecium ca. equalling or slightly exceeding stamens, arcuate, short pilose to tomentose, ovary more pubescent than gynophore and style, gynophore ca. equalling style, stigma capitate, green. Fruit linear, apiculate with persistent style, 2.0–2.5 cm long, brown, puberulent to glabrate, gynophore 2.0–2.5 cm long; seeds oblong to suborbicular, 8–10 mm long, 6–8 mm wide, surface dull, dark brown, funicular aril-lobe scars subequal, ca. 3 mm long.

Bauhinia divaricata ranges from Baja California Sur east to Tamaulipas and south to Costa Rica in Middle America. It ranges throughout the Greater Antilles, except for Puerto Rico. It also occurs in St. Christopher and St. Thomas in the Lesser Antilles; its absence from Puerto Rico suggests that it is introduced there. It is the most common species of the genus in Mexico, Belize, northern Guatemala, and the Greater Antilles. *Bauhinia divaricata* occurs in a variety of habitats ranging from moist, open, deciduous forest to dry cactus scrub and is common in disturbed sites throughout its range. It ranges in elevation from near sea level up to 1,500 m but it is most commonly found from sea level to about 800 m. It flowers throughout the year but is affected by the availability of moisture, flowering most abundantly in the wet season.

Bahinia divaricata is most closely related to *B. rubeleruziana* of southwestern Mexico, Guatemala, and Belize from which it may be distinguished by white flowers, lack of dense yellowish-brown pubescence, and smaller leaves. *Bauhinia divaricata* probably originated in the southern Mexico and Guatemala area and from there spread north in Mexico, south to Costa Rica in Central America, and east in the Antilles as far as St. Christopher of the Lesser Antilles.

Bauhinia divaricata is highly polymorphic in leaf size, shape, and vesture. The flowers are also somewhat variable but much less so than the leaves. There are several geographic races that have been described as segregate species. However, these races intergrade considerably and no satisfactory method of distinguishing them taxonomically has been found. It seems best at this time to treat them as belonging to a single taxon.

In Mexico the local names for this species are "Pata de Cabra," "Pie de Cabra," "Pata de Vaca,"

"Pie de Vaca," "Ts'ulubtok'," and "Sakts'ulubtok'," in Belize "Pata de Vaca," "Pie de Vaca," "Bull Hoof," "Ts'ulubtok'," and in the Cayman Islands "Bull Hoof," in Jamaica "Bull Hoof" and "Mocco John," and in the Dominican Republic "Pata de Chivo" and "Huella de Chivo."

Representative specimens: MEXICO. BAJA CALIFORNIA SUR: Buena Vista, *Brandege* 177 (A, GH, US). CAMPECHE: Tuxpeña, *Lundell* 962 (A, F, GH, MICH, MO, NY, UC, US, VT). CHIAPAS: 6 mi. SE of Chiapa de Corzo on Mexican Highway 190, *Raven & Breedlove* 20140 (F, LL, MICH, NY, US). COLIMA: Ca. 11 mi. SSW of Colima on Manzanillo road, *McVaugh & Koelz* 1598 (MICH, US). DURANGO: La Bajada, Tamazula, *Ortega* 4397 (US). GUERRERO: Atoyoc, *Hinton et al.* 10959 (F, GH, MICH, NY, P, UC, US). HIDALGO: Santa Ana, on Pan-American Highway, *Frye & Frye* 2652 (GH, MO, NY, UC). JALISCO: 18–20 mi. SW of Autlán, *Gentry* 10952 (MEXU, TEX). MICHOACÁN: Buena Vista, *Hinton et al.* 12085 (F, IJ, LL, MICH, NY, P, UC, US). MORELOS: Cañón de Lobos, km 14 on Cuernavaca-Yautepec road, *Fryxell* 764 (MO). NAYARIT: Vicinity of San Blas, *Ferris* 5484 (A, US). OAXACA: Yaveo, N bank of Río Yaveo, *Mexia* 9228 (F, GH, MO, NY, UC, US). PUEBLA: Near Matlaltayuca, *Goldman* 52 (GH, US). QUERÉTARO: 74 mi. NE of Zimapán, *Waterfall & Wallis* 14273 (TEX). QUINTANA ROO: Cozumel Island, vicinity of San Miguel de Cozumel, *Lewis* 6856 (DUKE, MO); SAN LUIS POTOSÍ: 2 mi. W of Xilitla on road to Jalpán, *King* 14308 (F, MICH, NY, TEX, UC, US). SINALOA: El Monte, near Los Labrados, *Mexia* 939 (A, GH, MICH, MO, NY, UC, US). TABASCO: Tenosique, *Matuda* 3397 (A, F, LL, MICH, MO, NY). TAMAULIPAS: Vicinity of Ciudad Victoria, *Palmer* 4 (CM, F, GH, MO, NY, UC). VERACRUZ: Near San Andrés Tuxtla, along river draining Laguna de Catemaca, *Dressler & Jones* 232 (GH, MEXU, MICH, MO, NY, UC, US). YUCATÁN: Izamal, *Gaumer* 336 (F, MO, NY, US, WIS). GUATEMALA. ALTA VERAPAZ: Along Río Sebol between Sebol and Carrizal, N of Sebol, *Steyermark* 45765 (F, LL). CHIMALTENANGO: Chimaltenango, *Johnston* 1735 (F). EL PROGRESO: Between Tulumajillo and Finca Montanita, *Steyermark* 43343 (A, F). HUEHUETENANGO: Paso del Boqueron, along Río Trapichillo, below La Libertad, *Steyermark* 51130 (F). PETÉN: Vaxactun, *Bartlett* 12511 (MICH, NY, UC, US). RATALHULEU: Between Nueva Linda and Champerico, *Standley* 87623 (F). ZACAPA: *Kellerman* 7875 (F, NY, UC, US). BELIZE. BELIZE: Near Gracie Rock, *Wunderlin* 5022 (MO). CAYO: 41 mi. section, Belize-Cayo Road, *Gentle* 9692 (F, IJ, MICH, TEX, UC, US). COROZAL: Adventura, *Gentle* 4745 (MICH, NY, UC). ORANGE WALK: Honey Camp, *Lundell* 640 (A, F, GH, MO, NY, UC, US). STANN CREEK: Stann Creek Railway, *Schipp* 221 (A, F, GH, MICH, MO, UC). TOLEDO: Forest Home, *Schipp* 8502 (F). HONDURAS. ATLANTIDA: Vicinity of La Ceiba, *Yuncker et al.* 8801 (F, GH, MICH, MO, NY, UC, US). COPÁN: Along Río Copán near Copán ruins, *Molina* 6624 (F, US). CORTÉS: Near La Lima, *Williams & Molina* 12454 (F, GH, MICH). EL PARAISO: Along the Río Guayambre, Valle Jamastrán, *Molina* 7367 (F). FRANCISCO MORAZÁN: Quebrada Contarranas, NE of Contarranas, *Molina* 7808 (F, US). SANTA BÁRBARA: San Pedro Sula,

Thieme 5183 (GH, NY, US). OLANCHO: Vicinity of Catacamas, *Standley 18410* (F). YORO: Agua Blanca, 10 mi. S of Progreso, *Record & Kuylen H.35* (GH, NY, US). EL SALVADOR. SONSONATE: Near Yuayua, *Pittier 1988* (NY, US). NICARAGUA. MATAGALPA: El Tuma, 30 km E of Matagalpa, *Neill 2351* (MO, USF). RIVAS: Along road SE of San Juan del Sur at Río La Flor, *Stevens 3822* (MO, USF). COSTA RICA. GUANACASTE: Ca. 11 km N of La Cruz, 0.5 mi. W of main road, *Liesner 4851* (MO, USF). CUBA. HAVANA: Isla de Pinos, Caleta Crocodrilos, *Britton et al. 15316* (NY). MATANZAS: Península de Zapata, *Ekman 18346* (F, MICH, MO, P, UC, US). PINAR DEL RÍO: Río Portales, *Shafer 11168* (F, MO, NY, US). CAYMAN ISLANDS. Little Cayman, near Snipe Point, *Proctor 28040* (IJ, LL). JAMAICA. CLARENDON: Near Salt River, *Wedderburn 267* (IJ). HANOVER: 2.2 mi. W of Sandy Bay, *Wunderlin 5097* (MO, USF). MANCHESTER: Vicinity of Mandeville, *Crawford 735* (NY, US). PORTLAND: Port Antonio, *Hitchcock s.n.* (MO, US). ST. ANDREW: Northern end of Long Mountain, just E of Kingston, *Crosby et al. 106* (DUKE, F, LL, MICH, MO, MSC, NY, UC, US, USF). ST. ANN: 1 mi. S of Boscobel, *Proctor 6624* (IJ, LL, US). ST. CATHERINE: Rodney's Lookout near Port Henderson, *Wunderlin 5073* (MO, USF). ST. ELIZABETH: Near Ipswich, *Maxon & Killip 1501* (F, ILL, US). ST. JAMES: Orange River, near Montego Bay, *Maxon & Killip 1668* (F, ILL, US). ST. THOMAS: Along road between Holland Bay and Morant Point, *Proctor 27843* (IJ, LL, MICH, US). TRELAWNY: Road N of Spring Garden toward Burnt Hill, *Anderson & Sternberg 1239* (DUKE, LL, MO, US). HAITI. GONAVE ISLAND: Vicinity of Etroite, *Leonard 3283* (NY, US). L'ARTIBONITE: Vicinity of Ennery, *Leonard 9470* (MO, US). NORD: Vicinity of St. Michel de L'Atalaye, *Leonard 7337* (F, NY, UC, US). OESTE: Near Turgeu Springs, Port-au-Prince, *Holdridge 985* (F, MICH, NY, TEX, US). SUD: Miragonne and vicinity, *Eyerdam 479* (F, MO, US). DOMINICAN REPUBLIC. AZUA: *Rose et al. 3955* (F, NY, US). BARAHONA: Montaña Nueva SE of Polo, *Howard & Howard* (MICH, NY, P, US). PEDERNALES: Banano, *Marcano 5248* (NY). ST. CHRISTOPHER. *Mason s.n.* (photograph of specimen at BM, IJ). ST. THOMAS. *Reidle s.n.* (P).

10. *Bauhinia erythrocalyx* Wunderlin, Sida 5: 353. 1974. TYPE: Mexico. Campeche: "Central Buenfil" (?Puerto Buen Fiel), *Lundell 1152* (holotype, F; isotypes, F, MICH).

Bauhinia petensis Lundell, *Wrightia* 5: 344. 1977. TYPE: Guatemala. Petén: Dos Lagunas, 1 km N of village, *Lundell & Contreras 20475* (holotype, LL, not seen; isotype, LL).

Shrubs or small trees up to 15 m tall; branches strigose when young, soon glabrate. Leaves chartaceous, ovate, bilobate for 1/2 their length, lobes divergent, 3.5–7.0 cm long, 4–6 cm wide, base cordate, apex of lobes obtuse, margins slightly crisped, upper surface glabrous, lower surface strigose, 7-nerved; petiole 1.5–3.0 cm long,

slightly canaliculate, strigose; stipules lanceolate, ca. 1.5 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection ca. 1.5 mm long, others minute. Inflorescences racemose, terminal, or subterminal and axillary, 10–20-flowered, rachis strigose, buds linear, 1.5–2.0 cm long, strigose, red, free tips minute; bract ovate-lanceolate, ca. 1 mm long; bracteoles similar to and slightly smaller than bract; pedicels 1–2 cm long, strigose, reddish; hypanthium cyathiform, 2–3 mm long; calyx spathaceous at anthesis; petals 5, subequal, white or cream, ca. 1.5 cm long, blade linear-lanceolate to oblanceolate, ca. 1/3 the length of claw, 2–3 mm wide, sparsely pilose externally, claw glabrate; fertile stamen 1, slightly exceeding the petals, filament slender, slightly arcuate, glabrous, connate with staminodes at base, anther oblong, 3–4 mm long, red, glabrate; staminodes 9, alternate staminodes slightly shorter, 1.0–1.5 cm long, connate for ca. 1/2 their length, pilose on inner surface at connate portion, abortive anthers present or absent; pollen peroblate, 3-colporoidate, reticulate; gynoeceum subequalling fertile stamen, slightly arcuate, ovary densely strigose, gynophore and style sparsely and loosely strigose, gynophore subequalling style, stigma slightly differentiated from style. Fruit linear, apiculate with persistent style, 7–10 cm long, ca. 1.5 cm wide, light brown, strigose to glabrate, gynophore ca. 2 cm long, glabrate; seeds oblong, 4–6 mm wide, dark brown, funicular aril-lobe scars subequal, ca. 1.5 mm long.

Bauhinia erythrocalyx is a rare species occurring in Campeche, Quintana Roo, and Yucatán, Mexico and adjacent Petén, Guatemala. It occurs in dry, often rocky, semideciduous forests at elevations from near sea level up to about 400 meters.

Bauhinia erythrocalyx is most closely related to *B. jenningsii*, a more common and widespread species occurring in the same general area. It is readily distinguished from *B. jenningsii* by its bilobate leaves.

Specimens examined: MEXICO. CAMPECHE: Near Xpujil, *Shepherd 16* (LL, WIS). YUCATÁN: 8 km W of Xpujil, *Waide s.n.* (WIS); Mérida, *Novelo 404* (US). QUINTANA ROO: 44 km S of Escárcega-Chetumal highway on road to Icaiché, *Guero & Grether 909* (MO); 8 km from the Chetumal-San Carillo Puerto highway on road to El Placer, *Télez & Cabrero 1277* (MO). GUATEMALA. PETÉN: Dos Lagunas, bordering the North Lake, *Contreras 1660* (LL).



FIGURE 1. *Bauhinia fryxellii*. A. Flowering branch. B. Flower ($\times 1.3$).

11. *Bauhinia fryxellii* Wunderlin, sp. nov., fig. 1. TYPE: Mexico. San Luis Potosí: Municipio Ciudad Valles, Rancho Pago Pago, 3.5 mi. by road W of Chantol, near juncture of Río Mesillas and Río Mico, *Fryxell & Anderson 3427* (holotype, USF; isotypes, to be deposited in CHAPA, ENCB, K, MO, MEXU, MICH, pf, TEX, US). ("pf" is the personal herbarium of Paul Fryxell.)

Bauhinia jucunda Brandeg. affinis, a qua imprimis differt foliis majoribus magis profunde lobatus, stylo breviori, et filamentis staminibus fertilibus pilosis ad basim.

Shrub to 1 m tall; branches sparsely puberulent-strigose when young, soon glabrate. Leaves chartaceous, bilobate $\frac{4}{5}$ or more their length, lobes narrowly elliptic-lanceolate, divergent, slightly arcuate, 8–11 cm long, 2.2–2.8 cm wide, base rounded, apex of lobes rounded, margins smooth or slightly crisped, upper surface bright green, glabrous, lower surface paler, minutely strigose, lobes 1–3-nerved; petiole 2.5–3.0 cm long, slender, slightly canaliculate, sparsely puberulent-strigose; stipules ovate, aristate tipped, ca. 2 mm long, caducous; adpetiolar intrastipular excrescence elongated and forming a flattened, slightly antrorsely arcuate spine ca. 2 mm long, others minute. Inflorescences short-racemose, axillary, 6-flowered, rachis sparsely strigose; buds linear, ca. 1.7 cm long, sparsely strigose, free tips obsolete; bract lanceolate, ca. 1.5 mm long, strigose; bracteoles similar to bract but slightly shorter; pedicels 3–4 mm long, strigose; hypanthium short tubular-campanulate, ca. 6 mm long; calyx spathaceous at anthesis, green; petals 2, only 1 well developed, linear, greenish-white, up to 1 cm long, pilose on inner surface, the smaller one up to 5 mm long or reduced to a short filament, rarely with a third vestigial petal; fertile stamen 1, 2.0–2.3 cm long, short-connate at base with staminodes, filament ca. 1.8 cm long, pilose on lower $\frac{1}{3}$, anther linear-oblong, 7–8 mm long, sparsely pilose on ventral surface; staminodes 9, united by their flattened filaments $\frac{1}{4}$ to $\frac{3}{4}$ their length, longest adjacent to fertile stamen ca. 8 mm long, shortest ca. 5 mm long, all without vestigial anthers, outer surface of staminal tube and free filaments pilose nearly to base, inner surface pilose only on upper part; pollen spheroid, 3-colporoidate, sexine striato-reticulate with elongate supracteal processes; gynoecium ca. 1.8 cm long, linear; ovary short stipitate, appressed pubescent, stipe ca. 5 mm long, strigose; style ca. 5 mm long, sparsely pilose, stigma capitate. Fruit linear-oblong, apiculate with persistent style, 6–

7 cm long, dark brown, sparsely strigose, gynophore ca. 1 cm long; seeds subquadrangular, 7–8 mm long, 4–6 mm wide, surface shiny, reddish-brown, funicular aril-lobe scars subequal, ca. 1.5 mm long.

Bauhinia fryxellii is a rare species known only from the type collection. It was collected at 110 meters elevation in a cut-over field. Collected in May, it was in flowering and fruiting condition.

Bauhinia fryxellii belongs to an alliance of five species that includes *B. chapulhuacania*, *B. deserti*, *B. dipetala*, and *B. jucunda*. This group differs from all other monandrous Neotropical species of *Bauhinia* in that they have a reduced number of petals, usually 2, rarely 1, 3, or 4. *Bauhinia fryxellii* is most closely allied to *B. jucunda* but differs in its larger, more deeply lobed leaves, shorter style, and the filament of the fertile stamen pilose near base.

The species is named in honor of one of its collectors, the noted student of Malvaceae, Paul A. Fryxell.

12. *Bauhinia jenningsii* P. Wilson in Britt., Bull. Torrey Bot. Club 43: 463. 1916. *Casparia jenningsii* (P. Wilson) Britt. & Rose, N. Amer. Fl. 23: 216. 1930. TYPE: Cuba. Havana: Isle de Pinos, Coe's Camp, Ensenada de Sigüanea, *Britton & Wilson 14851* (holotype, NY; isotypes, CM, F, MO, NY, P, US).

Bauhinia castilloi Standl., Publ. Field Mus. Nat. Hist. Bot. Ser. 22: 78. 1940. TYPE: Belize. Stann Creek: Freshwater Creek Reserve, *Castillo 48* (holotype, F).

Slender shrub or small tree to 6 m tall; branches glabrate. Leaves subcoriaceous, ovate to lanceolate, 7–14 cm long, 2.5–5.0 cm wide, apex acuminate to obtuse, base truncate to rounded, upper surface bright green, glabrous, lower surface lighter in color, strigulose to glabrate, 5-nerved; petioles 1.5–2.0 cm long, terete or slightly canaliculate, glabrate; stipules lanceolate, ca. 1.5 mm long, caducous, adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1.5 mm long, others minute. Inflorescences racemose, terminal or subterminal and axillary, 10–30-flowered, rachis loosely strigose, reddish; buds linear, 1.5–2.0 cm long, loosely strigose, red, free tips minute; bract lanceolate, ca. 0.5 mm long; bracteoles similar to bracts but slightly shorter; pedicels slender, 1.0–1.5 cm long, loosely strigose, reddish; hypanthium cyathiform. 2–

3 mm long; calyx spathaceous at anthesis; petals 5, subequal, white or cream, 1.2–2.0 cm long, blade linear-lanceolate to oblanceolate, subequalling claw, 2–3 mm wide, sparsely pilose externally, claw glabrate; fertile stamen 1, slightly exceeding the petals, filament 1.5–2.0 cm long, slender, slightly arcuate, glabrous, short-connate with staminodes at base, anther linear-oblong, 4–5 mm long, glabrous, staminodes 9, 1.0–1.5 cm long, alternate slightly shorter, connate for ca. $\frac{1}{3}$ their length, sparsely pilose on inner surface at connate portion, aborted anthers present; pollen peroblate, 3-colporoidate, sexine reticulate; gynoecium subequalling fertile stamen, slightly arcuate, ovary densely pilose, gynophore and style sparsely pilose, gynophore subequalling style, stigma not much differentiated from style. Fruit linear, apiculate with persistent style, 5–10 cm long, 1–2 cm wide, light brown, strigulose, gynophore ca. 2 cm long, glabrous; seeds oblong, 7–9 mm long, 5–7 mm wide, dark brown, funicular aril-lobe scars equal, ca. 2.5 mm long.

An uncommon species occurring in Cuba, the Yucatán Peninsula of Mexico, Belize, and northern Guatemala. It occurs in rocky, calcareous soils along the edge of dry to mesic or sometimes moist woods. It flowers from February to September.

Bauhinia jenningsii is a unique species, readily distinguished from other *Bauhinia* species within its range by its entire, *Smilax*-like leaves. It is most closely related to *B. erythrocalyx* of the Yucatán Peninsula. The flowers of the two species are very similar, but *B. jenningsii* differs in its entire leaf.

The local name for this species in Belize is "Cow Tongue" and the Mayan name in Mexico is "Chakts'ulubtok'."

Representative specimens: MEXICO. QUINTANA ROO: 3–4 mi. S of Felipe Carrillo Puerto, Wunderlin 5020 (MO, USF). YUCATÁN: Puerto Morelos, Goldman 624 (NY, US). GUATEMALA. PETÉN: Vaxactun, Bartlett 12145 (MICH, NY, UC, US). BELIZE. CAYO: Vaca, Gentle 2271 (MICH). CUBA. HAVANA: Isla de Pinos, San Juan, Britton et al. 15544 (CM, F, MO, NY, US).

13. *Bauhinia jucunda* Brandeg., Univ. Calif. Publ. Bot. 7: 326. 1920. *Casparia jucunda* (Brandeg.) Britt. & Rose, N. Amer. Fl. 23: 213. 1930. TYPE: Mexico. Veracruz: Barranca de Pancava, Brandege 8535 (holotype, UC).

Shrubs to 2 m tall; branches strigose when young, soon glabrate. Leaves chartaceous, bilo-

bate for $\frac{1}{2}$ or more their length, lobes lanceolate or triangular, divaricate, 5–8 cm long, 3–5 cm wide at base, 5–8 cm wide between lobes at tips, base cordate to truncate, apex of lobes obtuse, margins moderately crisped, upper surface glabrous, lower surface strigulose to glabrate, 5-nerved; petiole 1–2 cm long, slightly canaliculate, strigose; stipules lanceolate, ca. 1.5 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to ca. 1.5 mm long, other minute. Inflorescences racemose, terminal, or subterminal and axillary, 10–30-flowered, rachis strigulose, buds linear, 1.5–2.0 cm long, strigose, free tips minute; bract lanceolate, ca. 1.5 mm long; bracteoles similar, but smaller than bract; pedicels 0.5–1.2 cm long, strigose; hypanthium cyathiform, 3–5 mm long; calyx spathaceous at anthesis; petals usually 3, rarely 2 or 4, sometimes third and/or fourth represented only by a filament or obsolete, rarely a fifth vestigial petal present, white, linear, 1.0–1.5 cm long when fully developed, blade linear, 2–4 times longer than claw, densely pilose, ca. 1.5 mm wide, claw densely pilose; fertile stamen 1, ca. 1 cm longer than petals, filament slender, slightly arcuate, glabrous, slightly connate at base with staminodes, anther oblong, ca. 1 cm long, sparsely pilose; staminodes 9, 5–8 mm long, connate for $\frac{1}{2}$ or more their length, pilose, abortive anthers absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate with elongate supracteal processes; gynoecium subequalling fertile stamen, slightly arcuate, ovary tomentose, gynophore and style tomentellous, gynophore subequalling style, stigma capitate, slightly oblique. Fruit linear, apiculate with persistent style, 8–10 cm long, ca. 1 cm wide, brown-strigose, gynophore ca. 1 cm long, glabrate; seeds oblong, 6–8 mm long, 4–6 mm wide, surface dull, brown, funicular aril-lobe scars equal, ca. 1 mm long.

Bauhinia jucunda is a rare species endemic to a small area in eastern Veracruz, Mexico, and known from only a few collections. It occurs in low, deciduous forests at 200–500 m. It apparently flowers from July to November, rarely as early as April.

This species belongs to an alliance of five species that includes *B. chapulhuacania*, *B. deserti*, *B. dipetala*, and *B. fryxellii*. This species differ from other monandrous Neotropical species of *Bauhinia* in having a reduced number of petals, usually 2, rarely 1, 3, or 4. *Bauhinia jucunda* is most closely related to *B. fryxellii*, but differs in having

smaller, less deeply lobed leaves, a longer style, and a glabrous filament of the fertile stamen.

Specimens examined: MEXICO. VERACRUZ: Road from Xalapa on detour to Los Banos de Carrizal Emiliano Zapata, *Calzada 2043* (F, MEXU, USF); Plan del Río, Municipio Dos Ríos, *Ventura 5787* (MEXU, NY); *8994* (MEXU); La Ceiba, Municipio Puente Nacional, *Ventura 12061* (MEXU); Remudadera, *Purpus 8833* (GH, NY); *8986* (F, GH, MO, NY, UC, US); without precise locality, *Purpus 8940* (UC).

14. *Bauhinia lunarioides* A. Gray ex S. Wats., *Bibl. Ind. N. Amer. Bot.* 205. 1878. TYPE: Mexico. Coahuila: Rocky hills near Santa Rosa, *Perry 2901A* (holotype, GH).

Casparia congesta Britt. & Rose, *N. Amer. Fl.* 23: 211. 1930. *Bauhinia congesta* (Britt. & Rose) Lundell, *Phytologia* 1: 214. 1937. TYPE: Mexico. Coahuila: Mountains 24 mi. NE by N from Monclova, *Palmer 285* (holotype, US; isotypes, LE, NY, P, VT).

Casparia jermiana Britt. in Britt. & Rose, *N. Amer. Fl.* 23: 211. 1930. *Bauhinia jermiana* (Britt.) Lundell, *Phytologia* 1: 214. 1937. TYPE: United States. Texas: Gillespie Co.: Enchanted Rock, *Jermiana s.n.* (holotype, NY). [See discussion below.]

Shrub up to 4 m tall; branches loosely strigose when young, soon glabrate. Leaves subcoriaceous, broadly ovate to suborbicular, bilobate for $\frac{3}{4}$ or more their length, usually bifoliolate, lobes suborbicular, slightly divergent, inner margins straight to slightly convex, (1.0–)1.5–2.5(–3.0) cm long, (1.5–)2.0–2.5(–3.0) cm wide, base cordate or rarely truncate, apex of lobes rounded, margins slightly to moderately crisped, upper surface glabrous, lower surface strigose to glabrate, (5–)11-nerved; petiole 0.5–1.0(–1.5) cm long, slightly canaliculate, loosely strigose; stipules broadly lanceolate, ca. 1 mm long, caducous; intrastipular excrescences minute. Inflorescences short racemose, terminal, or subterminal, 2–6(–10)-flowered, rachis strigose, buds narrowly lanceolate, 1–2 cm long, loosely strigose with white hairs, occasionally purplish-tinged, free tips ca. 2 mm long; bract lanceolate, ca. 1 mm long; bracteoles similar but smaller than bract; pedicels slender, 0.5–1.0 cm long, strigose; hypanthium cyathiform, 1–2 mm long; calyx spathaceous at anthesis; petals 5, subequal, white or occasionally pinkish-tinged, 1.5–2.5 cm long, blade elliptic-lanceolate to ovate, ca. 3 times the length of claw, 0.7–1.2 cm wide, glabrous to sparsely pilose on inner surface, claw pilose to glabrate; fertile stamen 1, subequalling petals, filament slender, slightly arcuate, sparsely pilose at base,

short-connate with staminodes, anther oblong, 5–7 mm long, glabrous; staminodes 9, subequal, 5–7 mm long, connate for ca. $\frac{1}{2}$ their length, pilose below, rarely glabrous, abortive anthers usually present; pollen spheroid, 3-colporoidate, sexine striato-reticulate; gynoecium subequalling petals, slightly arcuate, gynophore ca. $\frac{1}{2}$ the length of style, gynophore and ovary pilose, stigma capitate, bilobate, dark in contrast with style. Fruit linear, apiculate with persistent style, 5–8 cm long, 1–2 cm wide, light brown, glabrate, gynophore ca. 5 mm long, strigose; seeds 7–10 mm long, 6–8 mm wide, surface dull, dark brown, funicular aril-lobe scars unequal, one ca. 1.5 mm long, other ca. 0.5 mm long.

Bauhinia lunarioides is restricted to Coahuila and Nuevo León, Mexico, and adjacent Texas. It occurs in desert scrub, primarily on calcareous soils at elevations of 500 to 2,00 m. It flowers primarily from March to June.

There is considerable debate concerning the distribution of this species in Texas. In addition to the several collections from the Anacacho Hills, Kinney County, by various collectors, single collections have been seen that, according to the label data, are from Gillespie (type of *Casparia jermiana*), Maverick, Presidio, Val Verde, and Webb counties. However, B. L. Turner and M. C. Johnston (pers. comm.) suspect that the label information for these collections is incorrect and that all Texas material is actually from the Anacacho Hills. The occurrence of the species in Texas in these counties, with the exception of Gillespie (see below), is logical and these herbarium records cannot be completely disregarded. However, not having personally verified the occurrence of the species at the reported localities in southern Texas, I reserve judgement on this point.

The type collection of *Casparia jermiana* Britt. is stated in the protolog and on the label of the holotype specimen to have come from Enchanted Rock, Gillespie County, Texas. However, this is probably an error since recent work has failed to produce any species of *Bauhinia* at Enchanted Rock. Furthermore, *B. lunarioides* grows primarily on calcareous soils and Enchanted Rock is a granite outcrop. It is possible that the collection is actually from the Anacacho Mountains in Kinney County where it is well known.

Bauhinia lunarioides is readily distinguished from the other white-flowered monandrous species of *Bauhinia* by its usually bifoliolate

leaves. Other species within the range of *B. lunarioides* that may occasionally have bifoliolate leaves have purple to pink flowers. It is probably most closely related to *B. divaricata* but is more northern and xerophilous than that species.

Representative specimens: UNITED STATES. TEXAS: Kinney Co.: Anacacho Ranch, SW slopes of Anacacho Mountains, *Correll & Rollins 32537* (FSU, TEX, UC, US). Maverick Co.: Near Eagle Pass, *Tharp 44159* (TEX). Presidio Co.: *Jermy s.n.* (MO). Val Verde Co.: SW side of the Devil's River, 0.25–0.5 mi. NW of confluence of the Devil's River and Dolan Creek, *Smith & Butterwick 166* (LL). Webb Co.: Near Laredo, *Warronock s.n.* (TEX). MEXICO. COAHUILA: San Lázaro, near the northern entrance of El Puerto de San Lázaro, *Wynd & Mueller 109* (A, ILL, MICH, MO, MSC, NY, US). NUEVO LEÓN: 8 mi. W of Monterrey on way to Saltillo, *Hitchcock & Stanford 6835* (NY, UC, US).

15. *Bauhinia macranthera* Benth. ex Hemsl., *Diag. Pl. Nov.* 49. 1880. *Casparia macranthera* (Benth. ex Hemsl.) Britt. & Rose, *N. Amer. Fl.* 23: 212. 1930. TYPE: Mexico. Hidalgo: Zimapán, *Coulter s.n.* (holotype, K).

Bauhinia retifolia Standl., *Contr. U.S. Nat. Herb.* 23: 416. 1922. *Casparia retifolia* (Standl.) Britt. & Rose, *N. Amer. Fl.* 23: 213. 1930. TYPE: Mexico. San Luis Potosí: Rascón, *Purpus 5268* (holotype, US; isotypes, F, MEXU, MO, NY, UC).

Casparia lunarioides A. Gray ex Britt. & Rose, *N. Amer. Fl.* 23: 212. 1930. TYPE: Mexico. Nuevo León: Sierra de la Silla, Monterrey, *Pringle 2529* (holotype, US; isotypes, A, CM, F, GH, MO, MSC, NY, P, UC, VT).

Bauhinia macranthera var. *grayana* Wunderlin, *Phytologia* 15: 53. 1967. Based on *Casparia lunarioides* A. Gray ex Britt. & Rose.

Shrub or small tree up to 4(–7) m tall; branches strigose or tomentose when young, soon glabrate. Leaves subcoriaceous, ovate, bilobate for 1/2 to 3/4 their length, rarely bifoliolate or lobed less than 1/2 their length, lobes parallel or slightly divergent, (3–)5–7(–11) cm long, (3.5–)5–8(–9) cm wide, base cordate, apex of lobes rounded to obtuse, margins slightly to strongly crisped, upper surface glabrous, lower surface strigose, pilose, or glabrate, 7–9(–11)-nerved; petiole 1.5–2.5(–4.0) cm long, slightly canaliculate, tomentose, strigose, or glabrate; stipules linear-lanceolate, ca. 2 mm long, caducous; intrastipular excrescences minute; inflorescences short-racemose, subterminal, axillary, 3–10-flowered, rachis strigose or tomentose, buds narrowly lanceolate, 2.0–2.5(–3.0) cm long, strigose or tomentellous, free tips setaceous, (2–)3–6(–10) mm long; bract linear-lanceolate, 1.5–2.0 mm long; bracteoles similar but smaller than bract; pedicels 3–6 mm long, strigose or

tomentose; hypanthium cyathiform, 1–2 mm long; calyx spathaceous at anthesis; petals 5, subequal, pink to purple darker-veined, (2.5–)3.0–3.5(–4.0) cm long, blade obovate to elliptic, subequalling length of the pilose claw, 0.5–1.0 cm wide, glabrous or sparsely pilose at base; fertile stamen 1, ca. 3/4 the length of petals, filament stout, arcuate, pilose at base, short-connate with staminodes, anther oblong, 7–9 mm long, sparsely pilose; staminodes 9, subequal, 6–8 mm long, connate ca. 1/2 their length, pilose below, abortive anthers present or absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate; gynoeceum subequalling petals, arcuate, densely pilose, gynophore subequalling style, stigma oblique, slightly differentiated from style. Fruit linear, apiculate with persistent style, (6–)8–12(–15) cm long, 1–2 cm wide, light brown, tomentose to glabrate, gynophore 1.0–1.5 cm long, glabrate; seeds oblong, 8–12 mm long, 6–8 mm wide, surface shiny, brown, funicular aril-lobe scars equal, ca. 4 mm long.

Bauhinia macranthera occurs in central and northeastern Mexico in open, deciduous forests at elevations ranging from 600 to 2,500 m. It flowers from March to August.

The closest relative to *B. macranthera* and that with which it has been confused is *B. ramosissima*. It is distinguished from that species by usually pink rather than purple flowers, larger, usually bilobate rather than bifoliolate leaves, and setaceous calyx tips.

Representative specimens: MEXICO. COAHUILA: Rancho Agua Dulce, lower slopes of the Sierra de San Miguel, *Wynd & Mueller 316* (A, ILL, MICH, MO, MSC, NY, US). HIDALGO: Puente de la Zorra, near Km 284 on highway NE of Jacala, *Moore 1711* (GH, UC, US). NUEVO LEÓN: Sierra Madre Oriental, waterway below Alamar, ca. 15 mi. SW of Galeana, *Mueller & Mueller 654* (A, F, MICH, NY, P, TEX, US). SAN LUIS POTOSÍ: Ca. 10 mi. NE of Ciudad del Maiz (17 mi. by road), *McVaugh 10434* (DUKE, GH, LL, MICH, MO, TEX, US). TAMAULIPAS: Along route 70, ca. 11 mi. S of Ciudad Victoria, *King 4552* (F, MICH, NY, TEX, UC, US). VERACRUZ: E of Rinconada, *Gregg 760* (MO, NY).

16. *Bauhinia multinervia* (H.B.K.) DC., *Prodr.* 2: 515. 1825. *Pauletia multinervia* H.B.K., *Nov. Gen. Sp. Pl.* 6: 316. 1825. TYPE: Venezuela. "Prope Caracas, Caripe et Montana de Capaya," *Humboldt & Bonpland 576* (holotype, P; microfiche, MO; isotype B(W); photographs of isotype at B(W), F, MO, US).

- Pauletia glaucescens* H.B.K., Nov. Gen. Sp. Pl. 6: 317. 1823. *Bauhinia glaucescens* (H.B.K.) DC., Prodr. 2: 515. 1825. TYPE: Venezuela. Sucre: *Humboldt & Bonpland 221* (holotype, P; microfiche, MO). *Bauhinia megalandra* Griseb., Fl. Brit. W. Ind. 213. 1860. LECTOTYPE: St. Vincent: *Guilding s.n.* (lectotype, K; photographs of lectotype, F, IJ, US). Lectotype here designated.

Large shrub or small tree up to 10 m tall; branches ferruginous puberulent when young, soon glabrate. Leaves chartaceous, suborbicular to oblong, bilobate for ca. $\frac{1}{2}$ their length, 7–15 cm long, 6–14 cm wide, base cordate to rounded, apex of lobes rounded, upper surface glabrous, lower surface glabrate or occasionally glaucous, ferruginous puberulent on nerves, (5–)7–9 (–11)-nerved; petioles 2–4 cm long, canaliculate, ferruginous pubescent or glabrate; stipules ovate, ca. 2 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1.5 mm long, others minute. Inflorescences racemose or paniculate through reduction of subterminal leaves opposite single flowers, up to 20-flowered, rachis ferruginous puberulent to velutinous, buds linear, 6–8 cm long, ca. 1 cm thick, ferruginous velutinous, apex rounded; bract triangular, ca. 1 mm long; bractioles similar to bract; peduncle 1–3 cm long, ferruginous puberulent or velutinous; hypanthium tubular, 2–3 cm long; calyx splitting into 5 lobes or lobes partly connate, curled and reflexed at anthesis, pale green on inner surface; petals 5, subequal, white, filiform, 8–12 cm long, 3–5 mm wide; fertile stamens 10, equalling or exceeding petals, alternate ones slightly shorter, slightly spreading, filaments slender, white, short-connate at base for ca. 1 cm, puberulent toward base and on inner surface, anthers 1.5–2.0 cm long, glabrous; pollen spheroid, 3–6-poroidate, sexine reticulate with blunt, spinelike infratectal processes; gynoecium subequalling stamens, ovary and gynophore purple, puberulent, style glabrate in upper $\frac{1}{2}$, greenish-white, gynophore subequalling style, stigma oblique. Fruit linear, apiculate with persistent style, 15–20 cm long, 2.0–2.5 cm wide, dark brown, gynophore 4–6 cm long, glabrate; seeds suborbicular, ca. 1.5 cm long, 1.0–1.5 cm wide, surface dull, dark brown, funicular aril-lobe scars extending $\frac{1}{2}$ way around edge of seed.

Bauhinia multinervia occurs in our range only in the Lesser Antilles where it is found in mesic forests at elevations up to about 900 m. This species also occurs in Venezuela, Suriname, and Brazil. It is sometimes cultivated as a novelty

within its natural range and in tropical areas outside it. *Bauhinia multinervia* flowers throughout the year, but most abundantly from October to March. This species is pollinated by bats.

Bauhinia multinervia is distinguished from other *Bauhinias* in our range by its large flowers. It is a part of the *B. unguolata* complex, which consists of about 50 species centered in the Planalto region of Brazil.

None of the collections of *B. multinervia* seen from the Lesser Antilles have been made since the late 1930's.

In Venezuela the species is known by the local names "Guarapo" and "Uripe."

Specimens examined: ANTIGUA. Northwest (volcanic district), Fig Tree Hill, *Box 1259* (UC, US); without precise locality, *Rose et al. 3401* (US). GUADELOUPE. Without precise locality, *Beaupertuis s.n.* (P); *Questel 690* (US); *Richard s.n.* (P). MARTINIQUE. St. Lucie, *Stehlé & Stehlé 3550* (US); without precise locality, *Belanger 490* (P); *Duss 1124* (NY); *Terrasson 44* (P). ST. VINCENT. Without precise locality, *Smith & Smith 273* (NY).

17. *Bauhinia pansamalana* Donn. Sm., Bot. Gaz. 13: 27. 1888. *Casparia pansamalana* (Donn. Sm.) Britt. & Rose, N. Amer. Fl. 23: 216. 1930. TYPE: Guatemala. Alta Verapaz: Pansamala, *Tuerckheim 681* (holotype, US; isotypes, NY, P).

Shrubs or small trees up to 5 m tall; branches glabrous. Leaves chartaceous, ovate, entire or bilobed up to $\frac{1}{3}$ their length, lobes slightly divergent, 12–22 cm long, 9–15 cm wide, base cordate to rounded, apex of entire leaf acuminate to caudate, apex of lobes acuminate, margins smooth or nearly so, glabrous on both surfaces, 7-nerved; petiole 3–6 cm long, slightly canaliculate, glabrous; stipules not seen, caducous; intrastipular excrescences minute. Inflorescences paniculate, terminal, or subterminal and axillary, 20–40-flowered, rachis and rachilla strigose to glabrate, buds linear, ca. 2 cm long, strigose, free tips minute; bract ovate, ca. 1 mm long; bractioles similar to bract; pedicels ca. 1.5 cm long, strigose; hypanthium cyathiform, 4–6 mm long; calyx spathaceous at anthesis; petals 5, subequal, white, 2.0–2.5 cm long, blade narrowly elliptic, ca. 2 times the length of the sparsely pilose claw, 2–3 mm wide, glabrate; fertile stamens 3, subequal, adnate with staminodes, subequalling petals, adaxillary and each separated by staminode, filaments slender, arcuate, pilose at base, anthers 4–5 mm long, glabrous, stamens and staminodes sparsely pilose on inner surface; staminodes 7,

subequal, 7–9 mm long, connate for ½ or more their length, abortive anthers present or absent; pollen spheroid, inaperturate, sexine reticulate with blunt, spinelike infratectal processes; gynoecium subequalling petals, arcuate, ovary strigose, gynophore and style glabrate, gynophore subequalling style, stigma oblique, slightly differentiated from style. Fruit linear, apiculate with persistent style, 20–30 cm long, 2.0–2.5 cm wide, glabrous, gynophore 4–6 cm long, glabrate; seeds not seen.

Bauhinia pansamalana is a rare species native to southern Mexico and Guatemala. It occurs in moist deciduous or tropical rainforests up to 1,200 meters in elevation. It flowers from April to July.

Bauhinia pansamalana is the only Middle American species of *Bauhinia*, other than *B. coulteri*, that has three fertile stamens. It occurs well to the south of the range of *B. coulteri* and can be further distinguished from that species by its large leaves.

Specimens examined: MEXICO. CHIAPAS: Finca Irlanda, Purpus 7302 (F, GH, MO, NY, UC, US). VERACRUZ: Rio Soloxohil between Cedillo and La Escudra, Vázquez et al. V-338 (MEXU). GUATEMALA. ALTA VERAPAZ: Between Sepacuite and Secoyocte, Pittier 333 (F, MO, NY, US); near Chirriacte on Petén Highway, Standley 91659 (F, US); Standley 91858 (F); Pansamala, Donnell Smith 1631 (US); near Finca Sepacuite, Cook & Griggs 581 (US). IZABAL: Along Río Bonita, Steyermark 41738 (F).

18. *Bauhinia pauletia* Pers., Syn. Pl. 1: 455. 1805.

Based on *Pauletia aculeata* Cav.

Pauletia aculeata Cav., Icon. 5: 6. 1799. TYPE: Panama. Panama: ?Near Panama City, Herb. Cavanilles (holotype, MA, not seen).

Bauhinia spinosa Poir., Encyc., Suppl. 1: 599. 1811.

Based on *Pauletia aculeata* Cav.

Bauhinia panamensis Spreng., Syst. Veg. 2: 334. 1825.

Based on *Pauletia aculeata* Cav.

Bauhinia leptopetala DC., Prodr. 2: 513. 1825. TYPE:

Based on a Sessé and Mociño Plate (copy, G, not seen; photograph of copy at G, F, MO, US; tracing of copy at G, US; photograph of tracing of copy at G, MO, US; blueprint of tracing of copy at G, MO, US).

Bauhinia parvifolia Seem., Bot. Voy. Herald 113. 1854;

non Hochst. ex Field. & Gard., 1844; non Teijsm. & Binn., 1867. TYPE: Panama. Panamá: Panamá Viejo, Seemann 223 (holotype, K; photograph of holotype, F, NY, US).

Bauhinia chlorantha Brandeg., Zoë 5: 200. 1905. TYPE:

Mexico. Sinaloa: Vicinity of Culiacán, Brandegees. n. (holotype, UC; isotype, US).

Bauhinia longiflora Rose, Contr. U.S. Nat. Herb. 10:

97. 1906; non (Bong.) Steud., 1840. TYPE: Mexico. Sinaloa: Ymala, Palmer 1426 (holotype, US; isotypes, F, NY, UC, US).

Shrub or small tree up to 5(–8) m tall; branches often subscandent, strigose or sparsely pilose when young, soon glabrate, armed with 1–2 intrastipular spines up to 6 mm long. Leaves chartaceous, broadly ovate to suborbicular, bilobate for ¼, rarely ½ their length, lobes divergent, (3–)4–6(–7) cm long, (3–)4–6(–7) cm wide, base cordate to rounded, apex of lobes rounded to obtuse, margins smooth or nearly so, upper surface glabrous, lower surface strigose and often sparsely pilose, pilose on nerves below, (7–)9-nerved; petiole 1–3 cm long, slightly canaliculate, pilose or strigose, rarely glabrate; stipules filiform, ca. 5 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a broad-based, occasionally reflexed spine, others minute. Inflorescence 1–2-flowered, axillary, subterminal, appearing racemose through suppression of subterminal leaves, buds filiform, bases inflated, 8–10(–12) cm long, strigose, free tips setaceous, 5–10 mm long; bract broadly to narrowly lanceolate, 2–4 mm long; bracteoles similar to bract; peduncle up to 3 mm long, pedicels 0.5–1.5 cm long, strigose or pilose; hypanthium suburceolate, 1–2 cm long, pilose on inner surface; calyx spathaceous or splitting into 2–5 lobes at anthesis, limb(s) twisting; petals 5, subequal, filiform, greenish-white, 4–6 cm long, 0.5–1.0 mm wide, glabrous, coiling and reflexed at anthesis; fertile stamens 5, 10–12 cm long, filaments filiform, spreading, glabrous, basally adnate with staminodes, anthers linear, 2.5–3.0 cm long, apex apiculate, base sagittate; staminodes 5, subequal, filiform, 3–5 cm long, glabrous, abortive anthers absent; pollen spheroid, 4–6-colpate, sexine reticulate with clavate supracteal processes; gynoecium subequalling stamens, slightly arcuate, ovary tomentose, gynophore and style glabrate, gynophore subequalling style, stigma lanceolate with lateral receptive surface. Fruit linear, apiculate with persistent style, (15–)20–25(–30) cm long, ca. 1.5 cm wide, light brown or tan, velutinous to glabrate at maturity, gynophore 4–6 cm long, glabrate; seeds oblong to suborbicular, 6–8 mm long, 5–7 mm wide, surface dull, chestnut-brown, funicular aril-lobe scars equal, 3–4 mm long.

Bauhinia pauletia ranges from western Mexico south to Colombia and Venezuela. It has been introduced into Puerto Rico where it has become

naturalized. It occurs in dry deciduous thorn forests and disturbed areas at elevations up to 400 m. It flowers throughout the year but most abundantly from May to January. It is known to be pollinated by at least two species of bats and has a high degree of andromonoecism (Heithaus et al., 1974).

Bauhinia pauletia is one of only two spiny species of *Bauhinia* within the range of this study. It is readily distinguished from the other species, *B. aculeata*, by its filiform buds 8–12 cm long, greenish-white, filiform petals, and five fertile stamens. It is closely related to a group of about six species in South America.

In Colombia the species is known by the local names "Pata de Vaca" and "Guajaro," in El Salvador as "Pie de Cabra," "Pie de Venado," and "Garrabatillo," in Guatemala as "Uña de Gato," in Honduras as "Garrabatillo," in Mexico as "Uña de Gato" and "Pie de Cabra," and in Panama as "Cuchillito."

Representative specimens: MEXICO. CHIAPAS: Above Finca Carmen, along road from Acalá to Pugiltik, *Ton* 3057 (DUKE, NY). COLIMA: Ca. 15 mi. SE of Manzanillo, *McVaugh & Koelz* 1618 (MICH). GUERRERO: Balsas Station, *Pringle* 10112 (CM, MO, MSC, NY, UC, US, VT). JALISCO: Ca. 2 km N of Puerto Vallarta W of airport, *Feddema et al.* 2559 (DUKE, MICH, TEX, US, WIS). MÉXICO: Naranjo, *Hinton* 1990 (NY, US). MICHOACÁN: 4 mi. NW of Apatzingán, *McVaugh* 17893 (DUKE, LL, MICH, US). MORELOS: *Sine loc.*, *Lemmon & Lemmon* 266 (UC). NAYARIT: 14 mi. SE of Saylita, *Johnson* 297-73 (UNAF). OAXACA: Tapanatepec, along Mexican Highway 190, *Breedlove & Raven* 13678 (F, LL, MICH, US). SINALOA: Culiacán, *Gentry* 5027 (F, MICH, MO, NY, UC, US). VERACRUZ: Juan Covarrubias, *Calderón* 2008 (F, MEXU). GUATEMALA. JUTIAPA: Laguna de Guija, *Heyde & Lux* 6324 (NY, US). SANTA ROSA: Llano Entero, SE of Chiquimulilla, *Standley* 78837 (F). HONDURAS. CHOLUTECA: Near Choluteca, *Williams & Molina* 10857 (F). COPÁN: Along Río Copán, 3 km from Santa Rita on way to La Entrada, *Molina & Molina* 24711 (MO, NY). OCOTEPEQUE: Along Río Lempa, road to Esquipulas, *Molina* 22404 (F). VALLE: Near Amapala, Isla Tigre, *Standley* 20711 (US). EL SALVADOR. LA PAZ: Km 37 toward Zacatecoluca, *Fassett* 29176 (MICH). LA UNIÓN: Vicinity of La Unión, *Standley* 20694 (NY, US). SAN MIGUEL: Ca. 15 km NE of San Miguel, *Tucker* 469 (F, MICH, UC, US). SANTA ANA: Vicinity of Metapán, *Standley & Padilla* 3281 (F, UC). SAN VICENTE: 3 mi. W of Río Lempa near San Nicolás Lempa, *Wunderlin* 5031 (MO). USULUTAN: Hacienda Concordia, *Calderón* 2093 (US). NICARAGUA. GRANADA: Near Granada, *Maxon et al.* 7623 (US). LEÓN: Quesalguaque, *Baker* 89 (MICH, MO, NY, UC). MANAGUA: S of Managua, *Garnier* 219 (US). MASAYA: Parque Nacional Volcán Masaya, *Neill* 2803 (MO, USF). COSTA RICA. GUANACASTE: Bebebero Road, 1.3 km W of Canas, *Heithaus*

390 (MO). PANAMA. CANAL ZONE: Between Miraflores and Corozal, *Pittier* 2202 (F, NY, US). COCLÉ: Road to Contractor's Hill, *Dwyer* 7224 (MO). HERRERA: Vicinity of Chitre, *Allen* 1086 (MO, US). LOS SANTOS: 6 mi. S of Las Tablas, *Croat* 9719 (DUKE, MO, SCZ). PANAMÁ: Las Sabanas, *Standley* 25841 (MO, US). PUERTO RICO. MAYAGUEZ: Between La Plata and Sabana Grande, *Urban* 3852 (MO, MSC, NY, US).

19. *Bauhinia pes-caprae* Cav., *Icon.* 5: 3. 1799. *Casparia pes-caprae* (Cav.) H.B.K., *Nov. Gen. Sp. Pl.* 6: 318. 1824. *Mandarus pes-caprae* (Cav.) Raf., *Sylva Tellur.* 122. 1838. TYPE: Mexico. Guerrero: *Nee s.n.* (holotype, MA, not seen; fragment of holotype, F; photograph of holotype, F, MO, US).

Bauhinia aegopoda St.-Lag., *Ann. Soc. Bot. Lyon* 7: 69. 1880, nom. illeg. (New name for *Bauhinia pes-caprae* Cav.)

Shrub or small tree up to 4(–6) m tall; branches strigose when young, soon glabrate. Leaves coriaceous, ovate to oblong, bilobate for $\frac{3}{4}$ or more their length, lobes parallel or rarely slightly divergent, (2–)4–6(–9) cm long, (2.5–)4–6(–8.0) cm wide, base deeply cordate, apex of lobes rounded to obtuse, margins slightly to moderately crisped, upper surface glabrous, lower surface strigose to glabrate, (5–)7-nerved; petiole 1–2 cm long, slightly canaliculate, strigose or glabrous; stipules ovate, apiculate, ca. 1 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1.5 mm long, others minute. Inflorescences racemose, terminal, frequently with additional subterminal axillary racemes, 30–60-flowered, rachis strigose, buds narrowly elliptic, 1.3–1.8 cm long, reflexed when young, erect at anthesis, densely strigose with white or tan hairs, free tips minute; bract ovate to lanceolate, 1.0–1.5 mm long; bracteoles similar to bract but smaller; pedicel slender, 1.5–2.0 cm long, strigose; hypanthium cyathiform, 1–2 mm long; calyx spathaceous at anthesis; petals 5, subequal, white, (1.5–)2.0–2.5(–3.0) cm long, blade narrowly elliptic, $\frac{1}{4}$ or less than the length of claw, 1–2 mm wide, pilose, claw densely pilose; fertile stamen 1, subequalling petals, filament slender, slightly arcuate, pilose at base, connate with staminodes, anther linear, 4–5 mm long, strigose; staminodes 9, subequal, 7–10 mm long, connate for $\frac{1}{3}$ or less their length, densely pilose except for short tips, abortive anthers absent or rarely present; pollen spheroid, 3-colporoidate, sexine reticulate; gynophore equalling or slightly exceeding petals, slightly arcuate, stri-

gose, gynophore subequalling style, stigma small, capitate. Fruit linear, apiculate with persistent style, (5-)8-10(-12) cm long, 1.5-2.0 cm wide, light brown, glabrate, gynophore ca. 2 cm long, strigose; seeds oblong, 7-9 mm long, 4-7 mm wide, surface dull, dark brown, funicular aril-lobe scars subequal, ca. 2 mm long.

Bauhinia pes-caprae is known only from along the southwestern coast of Mexico in the states of Guerro and Oaxaca. Most collections are from within a few miles of Acapulco. It occurs in dry, rocky, calcareous soils in open deciduous woods at elevations from near sea level up to 100 m. It flowers from January to April.

This species is most closely related to *B. pringlei* and *B. subrotundifolia*, from which it is distinguished by reflexed buds and deeply bilobate coriaceous leaves with nearly parallel lobes.

The local name is "Pie de Cabra."

Representative specimens: MEXICO. GUERRO: Acapulco and vicinity, *Palmer 441* (A, F, GH, MICH, MO, NY, UC, US). OAXACA: W of Tehuantepec at Km 79 on road to Oaxaca, *Barr & Mason 2373* (UC).

20. *Bauhinia petiolata* (Mutis ex DC.) Triana ex Hook. f., Bot. Mag. t. 6277. 1877. *Amara petiolata* Mutis ex DC., Prodr. 2: 519. 1825. TYPE: Colombia. *Mutis 2398* (holotype, MA, not seen; isotype, US).

Amara sessilifolia Mutis ex DC., Prodr. 2: 519. 1825. TYPE: Colombia: *Mutis 2724* (holotype, MA, not seen; fragment of holotype, US).

Casparia speciosa Linden ex Hook. f., Bot. Mag. t. 6277. 1877, pro syn.

Bauhinia caudigera Blake, Contr. U.S. Nat. Herb. 20: 533. 1924. *Schnella caudigera* (Blake) Pittier, Suppl. Pl. Usual. Venez. 37. 1939. TYPE: Venezuela. Carabobo: Guaremales, road from Puerto Cabello to San Felipe, *Pittier 8851* (holotype, US; isotype, P; photograph of holotype, NY, US).

Shrubs or small trees to 8 m tall; branches slender, glabrous. Leaves chartaceous, ovate to ovate-lanceolate, entire, 7-14 cm long, 3-7 cm wide, base rounded to truncate, apex caudate, upper surface glabrous, lower surface obscurely strigillose along the veins or glabrate, 5-nerved; petiole 1-3 cm long, slightly canaliculate; stipules ovate to réniform, ca. 1 mm long, persistent and becoming calloused, intrastipular excrescences obscure. Inflorescences short-racemose, terminal, or subterminal and axillary, the racemes 3-8-flowered, the rachis tomentellous or glabrate, buds narrowly ellipsoid, ca. 4 cm long, tomen-

tellous to glabrate; bract broadly ovate, ca. 1 mm long, ciliolate; bracteoles similar to bract; pedicels 4-7 mm long; hypanthium campanulate, 5-10 mm long; calyx spathaceous at anthesis; petals 5, subequal, 3-5 cm long, white, blade oblanceolate, 1.0-1.5 cm wide, glabrous, claw 2-5 mm long, glabrous; fertile stamens 10, slightly shorter than petals, the alternate ones slightly shorter, slightly connate at base, glabrate, anthers linear, 7-10 mm long, sparsely pilose or glabrate; pollen spheroid, inaperturate, sexine reticulate with blunt, spinelike infratectal processes; gynoecium 4-5 cm long, subequalling androecium, glabrous, ovary 2-3 cm long, style ca. 1.5 cm long, arcuate, stigma oblique, bilobate, gynophore subequalling the style or slightly shorter, stigma bilobate. Fruits linear, apiculate with persistent style, 20-30 cm long, 2-3 cm wide, glabrous, the gynophore ca. 2 cm long; mature seeds not seen.

Bauhinia petiolata is an uncommon species known from a few scattered localities in Colombia and Venezuela, and from a single collection in Panama. It occurs in tropical wet forests from near sea level up to 600 m. It has been collected in flower from February to July.

Bauhinia petiolata resembles *Bauhinia beguinotii* but differs in smaller leaves, stamens free to the base, and the main leaf nerves equidistant or closer to adjacent nerves than to the midrib. It also resembles *B. jenningsii*, but differs in stamen number.

Specimen examined: PANAMA. COLÓN: Ca. 2-3 mi. up the Río Guanche, *Kennedy & Foster 2127* (MO, USF).

21. *Bauhinia picta* (H.B.K.) DC., Prodr. 2: 515. 1825. *Pauletia picta* H.B.K., Nov. Gen. Sp. Pl. 6: 316. 1824. TYPE: Colombia. Santander: Along the Río Magdalena near the confluence with Río Opon, between Bohorquez and Isla de Brujas, *Humboldt 1604* (holotype, P; isotype, B(W), not seen; photograph of B isotype, F, MO, NY, US).

Bauhinia ligulata Pittier, Contr. U.S. Nat. Herb. 20: 112. 1918. TYPE: Panama. San Blas: Near Puerto Obaldia, *Pittier 4334* (holotype, US; fragment of holotype, NY; isotypes, F, NY, US).

Bauhinia kalbreyeri Harms, Repert. Spec. Nov. Regni Veg. 19: 65. 1923. TYPE: Colombia. Antioquia: Murri, *Kalbreyer 1802* (holotype, B, destroyed in World War II; fragment of holotype, F; photograph of holotype, F, MO, NY, US; isotypes, K, US; photograph of K isotype, F, NY, US).

Bauhinia conceptionis Britt. & Killip, Ann. New York

Acad. Sci. 35: 160. 1936. TYPE: Colombia. Chocó: La Concepción, 15 km E of Qyibdó, *Archer 2086* (holotype, NY; isotype, US).

Large trees up to 40 m tall; branches ferruginous tomentose when young, soon glabrate. Leaves chartaceous, ovate, bilobate for ca. $\frac{1}{4}$ or less their length, lobes slightly divergent, 4–10 cm long, 4.0–7.5 cm wide, base cordate to rounded, apex of lobes caudate to obtuse, upper surface glabrous, lower surface ferruginous tomentellous, at least on nerves, or glabrate, 9–13-nerved, petioles 2–3 cm long, slightly canaliculate, ferruginous tomentellous to glabrate; stipules ovate, ca. 1 mm long, scarious, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 2 mm long, others minute. Inflorescences short-racemose, axillary, subterminal, 10–20-flowered, flowers solitary or geminate, rachis ferruginous tomentose, buds elongate-clavate, 2.0–2.5 cm long, ferruginous tomentose, free tips minute; bract lanceolate, ca. 1 mm long; bracteoles similar to bract; pedicels 2–6 mm long, ferruginous tomentose; hypanthium campanulate, 6–8 mm long; calyx spathaceous, lobes sometimes becoming partly free; petals 5, subequal, white or pinkish with roseate center, 2–3 cm long, blade ovate-elliptic, 6–13 mm wide, glabrous, claw 2–4 cm long, glabrous or with a few short trichomes; fertile stamens 10, 5 subequalling petals, alternate ones slightly shorter, free to base or shortly connate, staminal sheath ligulate, tomentose on inner surface; pollen spheroid, inaperturate, sexine reticulate with blunt, spinelike infratectal processes; gynoecium subequalling stamens, ovary tomentose, style tomentellous, subequalling gynophore, stigma capitate, gynophore tomentellous. Fruit linear, apiculate with persistent style, 15–25 cm long, ca. 2.0 cm wide, gynophore 1–2 cm long, glabrate; seeds not seen.

Bauhinia picta is native to Colombia, Venezuela, and Panama. It occurs in light to heavy forests at elevations from near sea level up to about 1,500 m. In our range it is known only from the type collection of *Bauhinia ligulata* Pittier in Panama.

It is distinguished from other members of the *Petiolata* alliance by its usually pinkish flowers and ligulate staminal sheath.

In Colombia the local names are "Pata de Vaca," "Pate-buey de Monte," "Algodoncillo," "Casco de Vaca," and "Pate Buey."

22. *Bauhinia pringlei* S. Wats., Proc. Amer. Acad. Arts 25: 147. 1890. *Casparia pringlei* (S. Wats.) Britt. & Rose, N. Amer. Fl. 23: 212. 1930. TYPE: Mexico. Jalisco: Near Guadalajara, *Pringle 1722* (holotype, US; isotypes, A, F, GH, NY, P, UC, US, VT).

Shrub or small tree up to 5(–40) m tall; branches strigulose when young, soon glabrate. Leaves chartaceous, broadly ovate to suborbicular, bilobate for $\frac{1}{2}$ to $\frac{3}{4}$ their length, lobes slightly divergent, (5–)8–16(–18) cm long, (5–)7–15(–17) cm wide, base cordate to rarely truncate, apex of lobes rounded to obtuse, margins slightly to moderately crisped, upper surface glabrous, lower surface strigose to glabrate, 7–9(–11)-nerved; petiole 3–5(–7) cm long, slightly canaliculate, strigose to glabrate; stipules ovate, apiculate, ca. 1 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1.5 mm long, others minute. Inflorescence racemose, terminal, frequently with additional subterminal axillary racemes, 20–40-flowered, rachis strigose, buds linear-lanceolate, 1.5–2.0 cm long, densely strigose with white hairs, free tips minute; bract ovate to lanceolate, 1.0–1.5 mm long; bracteoles similar to bract but smaller; pedicels slender, 1.5–2.2 cm long, strigose; hypanthium cyathiform, 1–2 mm long; calyx spathaceous at anthesis; petals 5, subequal, white with a red median stripe, (1.5–)2–3(–3.5) cm long, blade narrowly elliptic, ca. twice the length of claw, 4–5 mm wide, glabrous or pilose at base, claw pilose; fertile stamen 1, $\frac{1}{2}$ to $\frac{3}{4}$ as long as petals, filament slender, pilose at base, connate with staminodes, anther linear, 4–6 mm long, glabrate; staminodes 9, subequal, 5–7 mm long, connate for $\frac{1}{3}$ or less their length, pilose ca. $\frac{1}{2}$ their length, tips purplish, abortive anthers usually present, rarely absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate; gynoecium subequalling petals, slightly arcuate, ovary strigose, style strigose, stigma small, capitate, gynophore subequalling the style, pilose toward base or glabrous. Fruit linear, apiculate with persistent style, (8–)10–12(–15) cm long, 1–2 cm wide, light brown, glabrous, gynophore ca. 2 cm long, glabrous; seeds suborbicular, 8–10 mm long, 6–9 mm wide, surface more or less shining, chestnut-brown, funicular aril-lobe scars unequal, one 2 mm, other 3.5 mm long.

Bauhinia pringlei occurs only in western Mexico on dry calcareous soils in open deciduous

forests at elevations from near sea level up to 800 meters. It flowers from November to January.

It is distinguished from all other monandrous species of *Bauhinia* by its white petals with a distinct median stripe. It is most closely related to *B. subrotundifolia* and *B. pes-caprae*.

The local name is "Pata de Venado."

Representative specimens: MEXICO. GUERRERO: N of Río Balsas, Ashotla, Barranca de la Juntas, *Mexia* 8899 (F, GH, LL, MO, NY, UC, US). JALISCO: Barranca de Guadalajara, *Pringle* 9723 (CM, F, GH, MO, NY, US, VT). MÉXICO: Guayabal, *Hinton* 5384 (A, MO, US). SINALOA: Cuesta de Tatamoza, road to Comedero, *Gentry* 5378 (GH, MEXU, MICH, MO, NY). ZACATECAS: 2 mi. N of Santa Rosa on Highway 41, ca. 42 mi. SW of Jalpa, *Mahler & Thieret* 5842 (NY).

23. *Bauhinia ramosissima* Benth. ex Hemsl., *Diag. Pl. Nov.* 49. 1880. *Casparia ramosissima* (Benth. ex Hemsl.) Britt. & Rose, *N. Amer. Fl.* 23: 210. 1930. TYPE: Mexico. Hidalgo: Zimapán, *Coulter* 473 (holotype, K; photograph of holotype, NY, US).

Bauhinia unguicularis Benth. ex Hemsl., *Diag. Pl. Nov.* 49. 1880. *Casparia unguicularis* (Benth. ex Hemsl.) Britt. & Rose, *N. Amer. Fl.* 23: 210. 1930. TYPE: Mexico. Hidalgo: Zimapán, *Coulter* 472 (holotype, K; photograph of holotype, A, F, NY, US).

Bauhinia uniflora S. Wats., *Proc. Amer. Acad. Arts* 21: 451. 1886; non Hassler, 1911. *Casparia uniflora* (S. Wats.) Britt. & Rose, *N. Amer. Fl.* 23: 209. 1930. (TYPE: Mexico. Coahuila: Jimulco, *Pringle* 174 (holotype, US; isotypes, CM, F, NY, P, US, VT).

Casparia monantha Britt. & Rose, *N. Amer. Fl.* 23: 209. 1930. *Bauhinia monantha* (Britt. & Rose) Lundell, *Phytologia* 1: 214. 1937. TYPE: Mexico. Coahuila: General Cepeda, *Palmer* 330 (holotype, US; isotypes, CM, F, MO, NY, UC).

Casparia purpusii Britt. in Britt. & Rose, *N. Amer. Fl.* 23: 210. 1930. *Bauhinia purpusii* (Britt.) Lundell, *Phytologia* 1: 214. 1937. TYPE: Mexico. Hidalgo: Ixmiquilpan, *Purpus* 1364 (holotype, NY; isotypes, F, MO, UC).

Casparia runyonii Britt. & Rose, *N. Amer. Fl.* 23: 210. 1930. *Bauhinia runyonii* (Britt. & Rose) Standl., *Trop. Woods* 34: 41. 1933. TYPE: Mexico. Tamaulipas: Mountains near Ciudad Victoria, in canyon on road to Jaumave, *Runyon* 748 (lectotype, US; isotype, NY). Lectotype here designated.

Densely branched shrub up to 3 m tall; branches strigose when young, soon glabrate. Leaves subcoriaceous, bifoliolate, leaflets oblong to suborbicular, inner margins more or less parallel, (0.5–)1.5–2.5(–3.0) cm long, (0.5–)1.0–1.5(–2.0) cm wide, base cuneate, apex rounded, margins

slightly crisped, upper surface glabrous, lower surface strigose to glabrate, 2(–3)-nerved; petiole 3–10 mm long, slightly canaliculate, strigose; stipules ovate to lanceolate, ca. 1.5 mm long, caducous; intrastipular excrescences minute. Inflorescences short-racemose or flowers solitary, terminal, or subterminal and axillary, 1–6-flowered, rachis strigose, buds narrowly lanceolate, 1.5–2.0 cm long, usually purple, tip often prolonged up to 5 mm, free tips up to 1.5 mm long; bract lanceolate, 1.0–1.5 mm long; bracteoles similar to bract, but smaller; pedicels 3–6 mm long, strigose; hypanthium cyathiform, 1–2 mm long; calyx spathaceous at anthesis; petals 5, subequal, purple, (1.5–)2.0–2.5(–3.0) cm long, blades elliptic, ca. $\frac{1}{3}$ the length of claw, 3–8 mm wide, glabrous or sparsely pilose at base, claw tomentose; fertile stamen 1, shorter than or equalling petals, filament slender, arcuate, glabrous or sparsely pilose near base, short-connate with staminodes, anther oblong, 7–9 mm long, glabrate; staminodes 9, subequal, 2–5(–7) mm long, connate for ca. $\frac{1}{2}$ their length, tomentose on inner surface, usually tomentose on outer surface near base, tip glabrous, purplish-tinged, abortive anthers present or absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate; gynoecium subequalling petals, arcuate, pilose, gynophore subequalling style, stigma small, capitate, slightly differentiated from style. Fruit linear, apiculate with persistent style, (5–)6–8(–9) cm long, 0.5–1.5 cm wide, light brown, strigose or glabrate, gynophore ca. 1 cm long, glabrate; seeds oblong to suborbicular, 5–8 mm long, 4–8 mm wide, chestnut-brown, surface dull, funicular aril-lobe scars equal, ca. 2.5 mm long.

Bauhinia ramosissima occurs in northeastern and central Mexico on rocky, calcareous soil in desert shrub communities at elevations of 800 to 2,500 m. It flowers throughout the year depending on sufficient moisture.

This species is distinguished from all other *Bauhinia* species within its range in that it is the only one that is both purple-flowered and bifoliolate. The only other bifoliolate species within its range, *B. lunarioides*, has white flowers. *Bauhinia ramosissima* is most closely related to *B. macranthera* with which it is sometimes confused. *Bauhinia macranthera* normally has bilobate but may rarely have bifoliolate leaves. However, *B. ramosissima* may be distinguished from *B. macranthera* by smaller, fewer-nerved

leaves and smaller flowers without conspicuous setaceous tips on the calyx.

Britton and Rose (1930) recognized six species that are here reduced to one. They were distinguished by leaf shape, number of flowers in the inflorescence, and petiole length; characters all too variable to be of value. There is a large amount of variation within both *B. ramosissima* and *B. macranthera*. Additional field study may show that some populations represent distinct taxa. On the basis of the data at hand at this time it seems best to recognize only two, distinct but variable species.

Britton and Rose's *Casparia runyonii* posed a problem because the paratypes belong to two different species. The specimens collected April 8, 1926, are *B. ramosissima* while those collected March 27, 1925, are *B. macranthera*. The protolog of the species is inadequate to determine with certainty which species Britton and Rose intended. It is perhaps a composite of the two species. The specimens also give no clue to resolve the matter. In their key, the species is placed close to *B. unguicularis* (which is now placed in synonymy with *B. ramosissima*) and I have elected to lectotypify the name in the sense of *B. ramosissima*.

Representative specimens: MEXICO. CHIHUAHUA: Near Cañón del Rayo, NE side of N end of Sierra del Diablo, *Stewart 936* (GH, TEX). COAHUILA: Sierra de la Paila, *Purpus 4742* (F, MO, UC, US). DURANGO: Sierra de Banderas, 54 km N of Bermejillo, *Chiang et al. 8302*. HIDALGO: Near Ixmiquilpan, *Rose et al. 9037* (US). NUEVO LEÓN: 14 km N of Matehuala, *Ripley & Barneby 13293* (NY). SAN LUIS POTOSÍ: Minas de San Rafael, Sierra de Guascama, *Purpus 5186* (F, MEXU, MO, NY, UC, US). TAMAULIPAS: Near Miquihuana, *Stanford et al. 783* (GH, MO, NY, UC). ZACATECAS: 2 km E of El Farolito, off Caopas-Tecolotes highway, *Johnston et al. 10464* (TEX).

24. *Bauhinia rubeleruziana* Donn. Sm., Bot. Gaz. 13: 27. 1888. *Casparia rubeleruziana* (Donn. Sm.) Britt. & Rose, N. Amer. Fl. 23: 214. 1930. TYPE: Guatemala. Alta Verapaz: Rubeleruz, *Tuerckheim 896* (holotype, US; isotypes, NY, P, US).

Bauhinia emarginella Standl., Publ. Carnegie Inst. Wash. no. 461. 60. 1935. TYPE: Belize. Toledo: Camp 32, British-Guatemala boundary, *Schipp S630* (holotype, F; isotypes, MO, NY).

Bauhinia palenquensis Lundell, Contr. Univ. Mich. Herb. 6: 24. 1941. TYPE: Mexico. Chiapas: Palenque, *Matuda 3666* (holotype, MICH; isotypes, F, NY).

Tree up to 15(-25) m tall; branches tomentose with yellowish-brown hairs when young, glabrate

in age. Leaves chartaceous, ovate to oblong ovate, bilobate for $\frac{1}{3}$ or less their length, emarginate or entire, 8-15 cm long, 5-12 cm wide, base cordate to rounded, apex of lobes acute to rounded, apex of entire leaves rounded to apiculate, margins smooth to slightly crisped, upper surface occasionally tomentellous on midvein, otherwise glabrous, lower surface tomentose to tomentellous with yellowish-brown hairs, 7-9-nerved; petiole 1.5-3.0 cm long, slightly canaliculate, tomentose with yellowish-brown hairs; stipules linear, ca. 1.5 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection ca. 1.5 mm long, others minute. Inflorescences racemose, subterminal, axillary, racemes usually 20-30-flowered, rachis tomentose with yellowish-brown hairs, buds linear-lanceolate, 1.5-2.0 mm long, frequently reddish-tinged, reflexed when young, ascending at anthesis, tomentose to tomentellous, free tips ca. 1 mm long; bract linear, ca. 4 mm long; bracteoles linear, ca. 2 mm long; pedicels 1-2(-2.5) cm long, tomentose with yellowish-brown hairs; hypanthium cyathiform, 2-3 mm long; calyx spathaceous at anthesis, reddish on inner surface; petals 5, subequal, brick-red, 1.5-2.5 cm long, blade narrowly elliptic, ca. 2 times as long as claw, 1.5-4.0 mm wide, sparsely pilose near tip on inner surface, claw glabrate; fertile stamen 1, subequalling petals, filament slender, arcuate, glabrous, connate with staminodes, anther linear-oblong, 3-4 mm long, glabrous; staminodes 9, subequal, 10-15 mm long, connate for $\frac{1}{3}$ or less their length, glabrous on outer surface, pilose on inner surface near and below connate part, abortive anthers present or absent; pollen spheroid, 3-colporoidate, sexine striate; gynoecium equalling or exceeding stamen, arcuate, ovary short pilose to tomentose, gynophore and style with fewer hairs, gynophore subequalling style, stigma small, not much differentiated from style. Legume linear, apiculate with persistent style, 10-16 cm long, ca. 2 cm wide, brown, glabrate, gynophore ca. 1.5 cm long, glabrate; seeds oblong to suborbicular, 9-12 mm long, 7-9 mm wide, surface dull, brown, funicular aril-lobe scars subequal, ca. 3 mm long.

Bauhinia rubeleruziana is an uncommon species occurring in moist deciduous forests and rainforests of southern Mexico, Guatemala, and Belize at elevations of 100 to 800 m. It flowers from March to July.

Bauhinia rubeleruziana is distinguished from all other species of *Bauhinia* within its range by its brick-red flowers in dense clusters. It is most

closely related to *B. divaricata* but distinguished from that species by yellowish-brown hairs on the lower surface of young leaves and branches.

Representative specimens: MEXICO. CHIAPAS: Between the Río Chocojanto and the Río Chancala, E of Santa Margarita, *Gómez-Pompa* 343 (US). GUATEMALA. ALTA VERAPAZ: Cubilquitz, *Tuerckheim* 7841 (MO, NY, US, VT). PETÉN: 3 km S of Poptun, *Harmon* 2508 (LL, MO, UMO). BELIZE. CAYO: Retiro Spring Camp Road, *Lamb* 79 (F).

25. *Bauhinia seleriana* Harms in Loess., Bull. Herb. Boissier 7: 549. 1899. TYPE: Guatemala. Huehuetenango: Near Quen Santo, *Seler & Seler* 2797 (holotype, B, destroyed in World War II; fragment of holotype, F; photograph of holotype, F, MO, NY, US; isotypes, K, NY, US; photograph of K isotype, F, NY, US).

Bauhinia paradisi Standl. & L. O. Williams, Ceiba 1: 80. 1950. TYPE: Honduras. El Paraíso: Río Lizapa floresta de robles area, between Galeras and Lizapa Grande, *Molina* 860 (holotype, US; photograph of holotype, NY; isotype, F).

Shrub or small tree up to 12 m tall; branches short-hirsute when young, soon glabrate. Leaves chartaceous, broadly ovate, bilobate for ca. $\frac{1}{3}$ their length, lobes slightly divergent, 6–10 cm long, 6–10 cm wide, base cordate to rounded, apex of lobes obtuse to rounded, upper surface glabrous, lower surface short hirsute or tomentellous, 9–11-nerved; petioles (1–)2–4(–5) cm long, slightly canaliculate, hirsute or tomentellous; stipules ca. 4 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1.5 mm long, others minute. Inflorescences racemose, terminal, or subterminal and axillary, 5–30-flowered, rachis short-hirsute or tomentellous, buds elliptic, 8–15 mm long, short-hirsute or tomentellous, free tips up to 2 mm long; bract lanceolate to linear, 1–4 mm long; bracteoles similar but slightly smaller than bract; pedicels 4–5 mm long, hirsute or tomentellous; hypanthium cyathiform, 1–2 mm long; calyx spathaceous at anthesis; petals 5, subequal, white, 11–18 mm long, blade elliptic, 4–8 mm wide, apiculate, pilose on tip, claw ca. 1 mm long; glabrous; fertile stamens 10, 5 subequalling petals, alternate ones $\frac{1}{2}$ the length of petals, unequally connate at base for 1–3 mm, inner surface tomentose, laciniate rim projecting above point of adnation, filaments slender, anthers linear-oblong, ca. 2 mm long on longer stamens, ca. 1.5 mm long on shorter stamens; pollen spheroid, inaperturate, sexine re-

ticulate with blunt, spinelike infratectal processes; gynoecium subequalling petals, tomentose, gynophore subequalling style, stigma capitate. Fruit linear, apiculate with persistent style, 8–10 cm long, ca. 1.5 cm wide, dark brown, tomentose, gynophore 0.5–1.0 cm long; seeds not seen.

Bauhinia seleriana occurs in deciduous forests in southern Mexico, Guatemala, and Honduras at elevations from 700 to 1,500 m. It flowers from April to October.

This species is distinguished from other Middle American species of the genus with ten fertile stamens by the hirsute young branches, inflorescences, and undersurface of the leaves. It is most closely related to *B. andrieuxii* from which it is distinguished by larger leaves and conspicuously hirsute parts. Also, *Bauhinia seleriana* is found in forests while *B. andrieuxii* is in open deciduous scrub.

Local names for this species in Guatemala are “Pata de Javalin” and “Nam-nam-te” and in Honduras “Pata de Buey.”

Representative specimens: MEXICO. CHIAPAS: Along Mexican Highway 190, 3 mi. S of La Trinitaria, *Breedlove* 14485 (NY). OAXACA: Ca. 3 km to the NE of Laollaga, *Télez & Magallanes* 233 (MEXU, MO). GUATEMALA. HUEHUETENANGO: Between Nenton and Las Palmas, *Steyermark* 51582 (F, US). ZACAPA: Loma El Picacho, above Santa Rosalia, *Steyermark* 42730 (F, NY, US). HONDURAS. CHOLUTECA: 6 km SW of Panamerican Highway, *Harmon & Fuentes* 5962 (UMO). EL PARAÍSO: Along Río California, Sierra de la Villa Santa, *Williams & Molina* 10479 (F, MO, UC, US, VT). FRANCISCO MORAZÁN: Along Quebrada Suyapa, near Suyapa, *Molina* 553 (F, MO, US).

26. *Bauhinia subrotundifolia* Cav., Icon. 5: 4. 1799. *Casparia subrotundifolia* (Cav.) H.B.K. ex Jackson in Index Kew. 1: 449. 1895, nom. inval. *Casparia subrotundifolia* (Cav.) H.B.K. ex Britt. & Rose, N. Amer. Fl. 23: 213. 1930. TYPE: Mexico. Guerrero: Vicinity of Acapulco, *Nee s.n.* (holotype, MA, not seen; fragment of holotype, F; photograph of holotype, F, MO, US).

Bauhinia lunaria Cav., Icon. 5: 4. 1799. *Casparia lunaria* (Cav.) H.B.K. ex Jackson in Index Kew. 1: 449. 1895, nom. inval. *Casparia lunaria* (Cav.) H.B.K. ex Britt. & Rose, N. Amer. Fl. 23: 213. 1930. TYPE: Mexico. Guerrero: Vicinity of Calavan and Acapulco, *Nee s.n.* (holotype, MA, not seen; fragment of holotype, F; photograph of holotype, F, MO, US).

Bauhinia rotundifolia Pers., Syn. Pl. 1: 455. 1805, nom. illeg. New name for *Bauhinia subrotundifolia* Cav. *Mandarus rotundifolius* (Pers.) Raf., Sylva Tellur. 122. 1838.

Casparia oaxacana Britt. in Britt. & Rose, N. Amer. Fl. 23: 212. 1930. *Bauhinia oaxacana* (Britt.) Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 11: 159. 1956. TYPE: Mexico. Oaxaca: Between Tequisistlán and Jalapa, *Seler 1687* (holotype, NY; isotype, GH).

Bauhinia subrotundifolia var. *salina-cruzana* Wunderlin, Southwest. Natur. 13: 104. 1968. TYPE: Mexico. Oaxaca: Salina Cruz, *Deam s.n.* (holotype, F).

Shrub or small tree up to 4(-7) m tall; branches densely short-pilose when young, soon glabrate. Leaves chartaceous, suborbicular, usually broader than long, bilobate for ca. $\frac{1}{2}$ their length, lobes slightly divergent, 2-4 cm long, 3-6 cm wide, base cordate to rarely rounded, apex of lobes rounded, margins smooth or slightly crisped, upper surface glabrous, lower surface pilose or strigose, (5-7)-nerved; petiole 1.5-2.5 cm long, slightly canaliculate, pilose to glabrate; stipules broadly lanceolate, ca. 1.5 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection ca. 1.5 mm long, others minute. Inflorescences racemose, terminal, or frequently subterminal and axillary, 10-30-flowered, rachis densely pilose or strigose, buds linear-oblong, 1.0-1.5 cm long, densely pilose with tan or whitish hairs, occasionally densely strigose, free tips minute; bract linear-lanceolate, ca. 1 mm long; bracteoles similar, but smaller than bract; pedicel slender, 0.5-1.0 cm long, pilose with tan or whitish hairs, occasionally strigose; hypanthium cyathiform, ca. 1 mm long; calyx spathaceous at anthesis; petals 5, subequal, white, 1.0-1.5 cm long, blade elliptic, equalling or shorter than claw, 1-2 mm wide, sparsely pilose, claw pilose; fertile stamen 1, slightly exceeding petals, filament slender, slightly arcuate, sparsely pilose at base, connate with staminodes, anther oblong, ca. 1.5 mm long, glabrate; staminodes 9, subequal, 5-7 mm long, connate for $\frac{1}{2}$ or more their length, pilose below, abortive anthers present or more commonly absent; pollen spheroid, 3-colporoidate, sexine striato-reticulate; gynoecium subequalling fertile stamen, slightly arcuate, ovary and gynophore densely pilose, style sparsely pilose to glabrate, gynophore subequalling style, stigma small, capitate, slightly differentiated from style. Fruit linear, apiculate with persistent style, 6-10 cm long, 1-2 cm wide, light brown, short-pilose; seeds suborbicular, 7-10 mm long, 6-8 mm wide, brown, funicular aril-lobe scars subequal, ca. 3 mm long.

Bauhinia subrotundifolia occurs along the

southwestern coast of Mexico from Jalisco southeast to Oaxaca in dry woods at elevations from near sea level up to 60 m. It flowers from October to March.

This species is most closely related to *B. pringlei* and *B. pes-caprae* from which it is distinguished by smaller, suborbicular leaves bilobate to about their middle. It is further distinguished from *B. pringlei* by pilose petals and from *B. pes-caprae* by always erect rather than reflexed flower buds.

Representative specimens: MEXICO. COLIMA: Between Colima and Armenia, *Delgradillo 31* (MEXU). GUERRERO: Acapulco and vicinity, *Palmer 398* (A, F, GH, MICH, MO, NY, UC, US). JALISCO: Coastal plain near highway to Autlán, 5 mi. N of Bahía Navidad, *McVaugh 20901* (MICH). MICHOACÁN: Aguila-Cofradía del Mar, *Hinton et al. 16217* (IJ, LL, MICH, NY, UC, US). OAXACA: Near Tehuantepec, *Alexander 236a* (2387) (MICH, NY, US).

27. *Bauhinia unguolata* L., Sp. Pl. 374. 1753. *Cansenia unguolata* (L.) Raf., Sylva Tellur. 122. 1838. *Pauletia unguolata* (L.) Schmitz, Bull. Jard. Bot. Nat. Belg. 43: 393. 1973. TYPE: *Herb. Miller* (holotype, BM, not seen).

Pauletia inermis Cav., Icon. 5: 6. 1799. *Bauhinia inermis* (Cav.) Pers., Syn. Pl. 1: 455. 1805; non Forsk., 1775; nec Perr., 1824; nec Billb. ex Walp., 1843. TYPE: Mexico. Guerrero: *Herb. Cavanilles* (holotype, MA, not seen).

Bauhinia cavanillei Millsp., Publ. Field Colombian Mus., Bot. Ser. 1: 364. 1898. Based on *Pauletia inermis* Cav.

Only names applying only to Middle American material are listed here. Additional names based on South American material will undoubtedly be placed in synonymy of this highly variable species when comprehensive study of the entire complex has been made.

Shrubs or small trees up to 7 m tall; branches densely brown strigose when young, soon glabrate. Leaves chartaceous, ovate to elliptic, bilobate to ca. middle, 5-12(-17) cm long, 3-8(-15) cm wide, base cordate to rounded, apex of lobes acute to rounded, upper surface glabrous, lower surface strigose or tomentellous, conspicuously glandular with medially attached boat-shaped glandular hairs, 7-9-nerved; petiole 1-3 cm long, slightly canaliculate, tomentellous; stipules ovate, ca. 1.5 mm long, caducous; adpetiolar intrastipular excrescence enlarged and forming a subulate projection up to 1.5 mm long, others

minute. Inflorescences appearing racemose through reduction of terminal leaves, consisting of 10–30 pairs of flowers produced at ends of branches, rachis tomentose to tomentellous, buds linear-oblong, subclavate, 4–5 cm long, tomentose to tomentellous, apex apiculate with short connate tips or rounded; bract ovate to lanceolate, 2–4 mm long; bracteoles similar to bract; peduncles up to 2 mm long; pedicels 0.5–1.5 cm long, tomentose to tomentellous; hypanthium short tubular, 8–15 mm long; calyx splitting to hypanthium into 5 lobes or lobes partly connate, curled, and reflexed at anthesis, inner surface white or cream; petals 5, subequal, white, blade narrowly linear to filiform, 2–3 cm long; stamens 10, equalling or exceeding the petals, alternate ones slightly shorter, slightly spreading, filaments slender, reddish, connate at base for 3–4 mm, sparsely pilose especially on connate portion with reddish hairs, anthers 9–12 mm long, glabrous; pollen spheroid, 3-colpate, sexine reticulate with clavate supracteal processes; gynoecium subequalling stamens, ovary tomentose, gynophore glabrate, subequalling style, style tomentellous, stigma oblique, differentiated from style. Fruit linear, apiculate with persistent style, 7–20 cm long, 0.7–1.3 cm wide, dark brown, puberulent, gynophore 2–3 cm long, glabrate; seeds oblong to suborbicular, 5–7 mm long, 4–5 mm wide, surface dull, dark brown, funicular aril-lobe scars subequal, 2–5 mm long.

In Middle America *B. unguolata* ranges from southern Mexico south to Panama. In western Mexico it occurs north as far as Sinaloa and in eastern Mexico it reaches Veracruz. The species is unreported from Honduras but is to be expected there. Outside Middle America this species is native to Colombia, Venezuela, Guyana, Peru, Brazil, Bolivia, and Paraguay. The species occurs in open deciduous forests, frequently in disturbed sites, at elevations from near sea level up to 1,300 m but is most common below 500 m. Flowering occurs throughout the year, but most commonly from October to March. The species is bat-pollinated.

Bauhinia unguolata is distinguished from other decandrous, unarmed *Bauhinia* species in Middle America by linear or subclavate flower buds in pseudoracemose inflorescences, and by narrow petals. It is allied to *B. multinervia* but has much smaller buds and fruits. *Bauhinia unguolata* is one of about 50 species in a complex centered

in southern Brazil. This complex is currently under investigation by the author.

The local names for this species in Belize are “Pie de Vaca,” in Costa Rica, Guatemala, and El Salvador “Pie de Venando,” and in Venezuela “Pata de Vaca”; and in Mexico it is known by the Spanish names “Pata de Vaca” and “Pata de Venado” as well as the Mayan name “Chakts’u-lubtok’.”

Representative specimens: MEXICO. CAMPECHE: Ca. 16 km SE of Champotón, *Taylor & Taylor 12668* (MO, US). CHIAPAS: Escuintla, *Matuda 60* (MICH, MO, NY, US). GUERRERO: Santo Tomás, Cerrito de Valle, *Mexia 8932* (F, MO, NY, UC, US). JALISCO: S of Puerto Vallarta, *Mexia 1124* (F, MICH, MO, NY, UC, US). MÉXICO: Ixtapan, *Hinton 5297* (NY, US). MICHOACÁN: Ca. 45–48 km S of Arteaga, 12–15 km S of Playa Azul, *McVaugh 22572* (DUKE, MICH, UC, US). NAYARIT: 21 mi. E of San Blas, between Navarrete and Tepic, *Rudd et al. 3030* (MO, US, WIS). OAXACA: Ca. 15 km SW of Santa María Zacatepec, *McVaugh 22225* (DUKE, MICH, UC, US). QUINTANA ROO: Km 160 along Mérida-Valladolid road, *Moreno 396* (MEXU). SINALOA: Rosario, *Rose et al. 14512* (US). TABASCO: Villahermosa, *Juzepczuk 1919* (F, K). VERACRUZ: La Purga, *Greenman 277* (F, GH, UC, US). YUCATÁN: Chichankanab, *Gaumer 2262* (F, MO, NY, US). GUATEMALA. ESQUINTLA: Near Esquintla, *Hayes s.n.* (US). HUEHUE-TENANGO: Canyon tributary to Río Trapichillo between Democracia and Chamuchu Canyon, *Steyermark 51279* (F). PETÉN: La Libertad and vicinity, *Aguilar 342* (MICH, MO, NY). RETALHULEU: Río Samala, *Shannon 533* (US). SANTA ROSA: Region of La Sepultura, W of Chiquemulilla, *Standley 79312* (F, MO). SOLOLÁ: Patalul, *Holway 194* (US). BELIZE. CAYO: Pine Ridge, Duck Run, *Bartlett 11554* (MICH, NY, US). EL SALVADOR: AHUACHAPÁN: Atiquiozoya, *Calderón 2442* (F, NY). CHALATENANGO: Along Tujutla Creek, highway to La Palma, *Molina & Montalvo 21572* (F, NY). LA LIBERTAD: 8 mi. NW of La Libertad, *Wunderlin 5043* (MO). LA UNIÓN: Vicinity of La Unión, *Standley 20688* (NY, US). MORAZÁN: NW of San Miguel, *Tucker 480* (F, MICH, UC, US). SANTA ANA: Vicinity of Santa Ana, *Standley 19687* (F, MO, NY, US). SAN SALVADOR: Tonacetepeque, *Standley 19470* (NY, US). SAN VICENTE: 3 mi. W of Río Lempa near San Nicolás Lempa, *Wunderlin 5032* (MO). SONSONATE: Ca. 3–5 mi. NW of Sonsonate, *Wunderlin 5045* (MO). NICARAGUA. CARAZO: W bank of the Río Escalante at the Carazo-Rivas border 1 km from the Pacific coast, *Neill 1295* (MO). GRANDE: Grande, *Levy 366* (P). LEÓN: W of Quebrada Las Ruedas and along stream, NW of El Tránsito, *Stevens 5441* (MO, USF). MANAGUA: Along Route 10 between Managua and Masachapa, 10 mi. S of junction with Route 12, *Croat 43701* (MO, USF). COSTA RICA. ALAJUELA: Orotina, *Holway 315* (US). GUANACASTE: Ca. 20–30 km W of Liberia, *Williams et al. 26487* (F, NY). PUNTARENAS: Between Quebrada Grande and Quebrada Guajiniquil near Buenos Aires, *Molina et al. 18145* (F, NY). PANAMA. CANAL ZONE: Vicinity of San Feliz, *Pittier 5281* (NY, US). CHIRIQUÍ: Quebrada Las Canas, 9 km N of David, *Partch 69-66*

(MO). DARIÉN: Patino, *Duke 10545* (MO, NY).
HERRERA: 4 mi. S of Los Pozos, *Tyson 2648* (MO, SCZ, US).

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